DESCRIPTION OF THE PROGRAM OF STUDIES

1. Description

1.1 Number of semesters: 4	*1.2 Total number of ECTS points necessary to complete studies at a given level: 90*
1.3 Total number of hours: *781*	*1.4 Prerequisites (particularly for second-level studies):* *Completed undergraduate or graduate degree in the field, in which contents of Electrical Engineering related to Circuit Theory and Theory of Electromagnetic Field are contained as well as knowledge gained from at least one of the courses: Electrical Drives, Electrical Devices, Fundamentals of Control Theory, High Voltage Engineering.*
1.5 Upon completion of studies graduate obtains professional degree of: *master of science, engineer*	*1.6 Graduate profile, employability:* *A graduate of the second degree studies in the specialization Industrial Electrical Engineering has advanced and well-established knowledge of electrical engineering applications in industrial processes including automation. Has ability to use computer tools for designing and modelling. It is capable of creative work and to make decisions and lead work-team labour. He is prepared to continue their education in Doctoral School.*
1.7 Possibility of continuing studies: *Doctoral School*	*1.8 Indicate connection with University's mission and its development strategy:* *The knowledge gained during studies will not only lead to success in future professional career of the graduate, but also shapes the human being with a sense of entrepreneurship, creativeness and openness to new challenges.*

2. Detailed description:

2.1 Total number of learning outcomes in the program of study:

W (knowledge) = 20
U (skills) = 18
K (competences) = 7
W + U + K = 45

2.2 For the main field of study assigned to more than one discipline - the number of learning outcomes assigned to the discipline:

D1 (major): 45

2.3 For the field of study assigned to more than one discipline - percentage share of the number of ECTS points for each discipline:

D1 100 % ECTS points

2.4a. For the general academic profile field of study – the number of ECTS points assigned to the classes related to the University's academic activity in the discipline or disciplines to which the faculty is assigned:

82 ECTS

2.5. Concise analysis of compliance of the assumed learning outcomes with the needs of the labor market:

Learning outcomes refer not only to the broadly understood electrical engineering, i.e. the application of electrical engineering in industrial processes, diagnostics and automation, 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 outcomes will enable graduates to find attractive and interesting work in all industries, where electrical engineering is applied. The graduate is also prepared to start business in electrical engineering field. Proceedings on the learning outcomes 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.

2.6. The total number of ECTS points that a student must obtain in classes requiring direct participation of academic teachers or other persons conducting classes and students (enter the sum of ECTS points for courses / groups of courses marked with the BK1 code)

63 ECTS

2.7. 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

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

Number of ECTS points for obligatory subjects	19
Number of ECTS points for optional subjects	27
Total number of ECTS points	46

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

8 ECTS points

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

36 ECTS points

3. Description of the process leading to learning outcomes acquisition:

Teachers delivering the individual courses during the first lecture present the aim and program of the respective course as well as explain the assumed teaching outcomes. Indicate a need of the self-work of student and explain how to use basic and supplementary literature for a given course. Motivate to attend regularly the classes and to use consultations.

4. List of education blocks:

4.1. List of obligatory blocks

4.1.1. List of general education blocks

4.1.1.1. Liberal-managerial subjects block

No.	Course code	Name of course	Weekly number of hours					Learning 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

4.1.1.2. Foreign languages block

No.	Course code	Name of course	Weekly number of hours					Learning 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

4.1.1.3. Sporting classes block

No.	Course code	Name of course	Weekly number of hours					Learning 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

4.1.1.4. Information technologies block

No.	Course code	Name of course	Weekly number of hours					Learning 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 blocks

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	0	0	0	0	0	0

4.1.2. List of basic sciences blocks

4.1.2.1. Mathematics block

No.	Course code	Name of course	Weekly number of hours					Learning 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	ELR051372W ELR052172W ELR052572W	Numerical methods in engineering	1					K2ETK_W2 K2ETK_K2	11	30	1	0,7	T	Z			PD	OB
2	ELR051372P ELR052172P ELR052572P	Numerical methods in engineering				1		K2ETK_U2 K2ETK_K2	11	30	1	0,7	T	Z		P	PD	OB
		Total	1	0	0	1	0		22	60	2	1,4						

4.1.2.2. Physics block

No.	Course code	Name of course	Weekly number of hours					Learning 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	ELR053366W	Electrical Measurement Nonelectrical Values	1					K2ETK_W5 K2ETK_K2	11	60	2	1,4	T	Z			PD	OB
2	ELR053366L	Electrical Measurement Nonelectrical Values			1			K2ETK_U4 K2ETK_K2	11	30	1	0,7	T	Z		P	PD	OB
		Total	1	0	1	0	0		22	90	3	2,1						

4.1.2.3. Chemistry block

No.	Course code	Name of course	Weekly number of hours					Learning 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 blocks

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	150	5	3,5

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

4.1.3.1. Obligatory main-field-of-study block

No.	Course code	Name of course	Weekly number of hours					Learning 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	ELR051371W	Selected problems of circuit theory	2					K2ETK_W1	22	90	3	2,1	T	E			K	OB
2	ELR051371C	Selected problems of circuit theory		1				K2ETK_U1 K2ETK_K1	11	30	1	0,7	T	Z		P	K	OB
3	ELR052271W	Short-circuits in power systems	2					K2ETK_W3 K2ETK_K3	22	60	2	1,4	T	Z			K	OB
4	ELR053262W	Electromechanical drive systems	2					K2ETK_W4	22	90	3	2,1	T	E			K	OB
5	ELR053262L	Electromechanical drive systems			1			K2ETK_U3 K2ETK_K1	11	30	1	0,7	T	Z		P	K	OB
		Total	6	1	1	0	0		88	300	10	7						

Altogether for main-field-of-study blocks

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	300	10	7

4.1.4. List of specialization blocks

4.1.4.1. Obligatory specialization subjects block

No.	Course code	Name of course	Weekly number of hours					Learning 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	ELR051163W	High Voltage Measurement and diagnostics of insulation	2					S2ETP_W4 K2ETK_K3 K2ETK_K6	22	60	2	1,4	T	Z			S	OB
2	ELR051164L	High Voltage Measurement and diagnostics of insulation			2			S2ETP_U7 K2ETK_K3 K2ETK_K6	22	60	2	1,4	T	Z		P	S	OB
3	ELR051165W	Lightning and overvoltage protection in buildings	1					S2ETP_W7 K2ETK_K3	11	60	2	1,4	T	Z			S	OB
4	ELR051269W	Electromagnetic materials	2					S2ETP_W3 K2ETK_K1	22	60	2	1,4	T	Z			S	OB
5	ELR051270L	Electromagnetic materials			1			S2ETP_U6 K2ETK_K1 K2ETK_K3	11	30	1	0,7	T	Z		P	S	OB
6	ELR051274W	Strong electrical and magnetic fields in technology	2					S2ETP_W8 K2ETK_K6	22	90	3	2,1	T	E			S	OB
7	ELR051274L	Strong electrical and magnetic fields in technology			2			S2ETP_U5 K2ETK_K6	22	60	2	1,4	T	Z		P	S	OB
8	ELR051275W	Thermokinetics of electric and electronic devices	2					S2ETP_W9 K2ETK_K6	22	60	2	1,4	T	Z			S	OB
9	ELR052371W	Computer Aided Design (CAD) in Energetic	2					S2ETP_W10 K2ETK_K2	22	60	2	1,4	T	Z			S	OB
10	ELR052371L	Computer Aided Design (CAD) in Energetic			1			S2ETP_U8 K2ETK_K2	11	60	2	1,4	T	Z		P	S	OB
11	ELR053267W	Automation of production processes - selected issues	1					S2ETP_W1 K2ETK_K7	11	60	2	1,4	T	Z			S	OB
12	ELR053267L	Automation of production processes - selected issues			2			S2ETP_U1 K2ETK_K7	22	60	2	1,4	T	Z		P	S	OB
13	ELR053268W	Controlled electrical drives - selected problems	2					S2ETP_W5	22	120	4	2,8	T	E			S	OB
14	ELR053268L	Controlled electrical drives - selected problems			2			S2ETP_U2 K2ETK_K2 K2ETK_K6	22	60	2	1,4	T	Z		P	S	OB
15	ELR053269W	Power converters in supply and control system	2					S2ETP_W2 K2ETK_K1	22	120	4	2,8	T	E			S	OB
16	ELR053269L	Power converters in supply and control system			2			S2ETP_U4 K2ETK_K1	22	60	2	1,4	T	Z		P	S	OB
17	ELR053270W	Computer aided modeling and design of the control system	1					S2ETP_W6	11	30	1	0,7	T	Z			S	OB
18	ELR053270L	Computer aided modeling and design of the control system			2			S2ETP_U3 K2ETK_K6	22	60	2	1,4	T	Z		P	S	OB
		Total	17	0	14	0	0		341	1170	39	27,3						

Altogether for specialization blocks

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				
17	0	14	0	0	341	1170	39	27,3

4.2. List of optional blocks

4.2.1. List of general education blocks

4.2.1.1. Liberal-managerial subjects block

No.	Course code	Name of course	Weekly number of hours					Learning 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_U7 K2ETK_K6	11	50	2	1,4	T	Z	O	P	KO	W
2	PKH550422S	Social communication					1	K2ETK_U7 K2ETK_K6	11	50	2	1,4	T	Z	O	P	KO	W
3	PKH555522S	The art of public speaking					1	K2ETK_U7 K2ETK_K6	11	50	2	1,4	T	Z	O	P	KO	W
4	PRR051271W	Standardization and engineering law	1					K2ETK_W7 K2ETK_K3 K2ETK_K5	11	25	1	0,7	T	Z	O		KO	W
5	PRR051272W	Engineering law	1					K2ETK_W7 K2ETK_K3 K2ETK_K5	11	25	1	0,7	T	Z	O		KO	W
6	PRR051273W	Technical Standardization	1					K2ETK_W7 K2ETK_K3 K2ETK_K5	11	25	1	0,7	T	Z	O		KO	W
7	ZMR052571W	Management of a Company	1					K2ETK_W6 K2ETK_K3 K2ETK_K6	11	50	2	1,4	T	Z	O		KO	W
8	ZMR052579W	Management in the power industry	1					K2ETK_W6 K2ETK_K3 K2ETK_K6	11	50	2	1,4	T	Z	O		KO	W
		Total	2				1		33	125	5	3,5						

4.2.1.2. Foreign languages block

No.	Course code	Name of course	Weekly number of hours					Learning 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_U6 K2ETK_K1	33	60	2	1,4	T	Z	O	P	KO	W
2	JZL030002BKC	Foreign language B2+ or C1+		1				K2ETK_U5 K2ETK_K1	11	30	1	0,7	T	Z	O	P	KO	W
		Total	0	4	0	0	0		44	90	3	2,1						

4.2.1.3. Sporting classes block

No.	Course code	Name of course	Weekly number of hours					Learning 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 block

No.	Course code	Name of course	Weekly number of hours					Learning 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 blocks

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	215	8	5,6

4.2.2. List of basic sciences blocks

4.2.2.1. Mathematics block

No.	Course code	Name of course	Weekly number of hours					Learning 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

4.2.2.2. Physics block

No.	Course code	Name of course	Weekly number of hours					Learning 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

4.2.2.3. Chemistry block

No.	Course code	Name of course	Weekly number of hours					Learning 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 blocks

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	0	0	0	0	0	0

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

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

No.	Course code	Name of course	Weekly number of hours					Learning 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 main-field-of-study blocks

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	0	0	0	0	0	0

4.2.4. List of specialization blocks

4.2.4.1. Specialization subjects block

No.	Course code	Name of course	Weekly number of hours					Learning 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	ELR051276W	Plasma technologies in industry	2					S2ETP_W12 K2ETK_K4	22	60	2	1,4	T	Z			S	W
2	ELR051277W	Electrical Low Power Supplies	2					S2ETP_W12 K2ETK_K6	22	60	2	1,4	T	Z			S	W
3	ELR051278W	Optoelectronics	2					S2ETP_W12 K2ETK_K1	22	60	2	1,4	T	Z			S	W
4	ELR051373W	Applied photovoltaics	2					S2ETP_W12 K2ETK_K6 K2ETK_K7	22	60	2	1,4	T	Z			S	W
5	ELR052373W	Conventional and Intelligent installations	2					S2ETP_W13 K2ETK_K1	22	60	2	1,4	T	Z			S	W
6	ELR052472W	Modern electrical devices	2					S2ETP_W13 K2ETK_K1	22	60	2	1,4	T	Z			S	W
7	ELR052476W	Rationalization of energy consumption	2					S2ETP_W13 K2ETK_K6	22	60	2	1,4	T	Z			S	W
8	ELR053165W	Permanent magnet electrical machines	2					S2ETP_W11	22	60	2	1,4	T	E			S	W
9	ELR053165L	Permanent magnet electrical machines			1			S2ETP_U9 K2ETK_K7	11	30	1	0,7	T	Z		P	S	W
10	ELR053166W	Field-circuit modelling of electrical machines and apparatus	2					S2ETP_W11	22	60	2	1,4	T	E			S	W
11	ELR053166L	Field-circuit modelling of electrical machines and apparatus			1			S2ETP_U9 K2ETK_K7	11	30	1	0,7	T	Z		P	S	W
12	ELR053271W	Diagnostics of industrial processes	2					S2ETP_W11	22	60	2	1,4	T	E			S	W
13	ELR053271L	Diagnostics of industrial processes			1			S2ETP_U9 K2ETK_K7	11	30	1	0,7	T	Z		P	S	W
14	ELR053272W	Power electronics converters in industry	2					S2ETP_W11 K2ETK_K6	22	60	2	1,4	T	E			S	W
15	ELR053272L	Power electronics converters in industry			1			S2ETP_U9 K2ETK_K6	11	30	1	0,7	T	Z		P	S	W
16	ELR053273W	Electrical drives vehicles	2					S2ETP_W11 K2ETK_K6 K2ETK_K7	22	60	2	1,4	T	E			S	W
17	ELR053273L	Electrical drives vehicles			1			S2ETP_U9 K2ETK_K6 K2ETK_K7	11	30	1	0,7	T	Z		P	S	W
18	ELR053367W	Measurement systems management	2					S2ETP_W11 K2ETK_K2	22	60	2	1,4	T	E			S	W
19	ELR053367L	Measurement systems management			1			S2ETP_U9 K2ETK_K2	11	30	1	0,7	T	Z		P	S	W
20	ELR053369W	Microprocessor techniques in measuring systems	2					S2ETP_W11 K2ETK_K6	22	60	2	1,4	T	E			S	W
21	ELR053369L	Microprocessor techniques in measuring systems			1			S2ETP_U9 K2ETK_K6	11	30	1	0,7	T	Z		P	S	W
22	ELR053380W	Measurement methods and techniques	2					S2ETP_W11	22	60	2	1,4	T	E			S	W
23	ELR053380L	Measurement methods and techniques			1			S2ETP_U9 K2ETK_K2	11	30	1	0,7	T	Z			S	W
		Total	6		1				77	210	7	4,9						

4.2.4.2. Training block

No.	Course code	Name of course	Weekly number of hours					Learning 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

4.2.4.3. Diploma dissertation block

No.	Course code	Name of course	Weekly number of hours					Learning 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	ELR051198S ELR053198S	Diploma seminar					2	S2ETP_U10 K2ETK_K6	22	90	3	2,1	T	Z		P	S	W
2	ELR051199D ELR052199D ELR053199D	Master's thesis				12		S2ETP_U11 K2ETK_K4 K2ETK_K6	132	540	18	12,6	T	Z		P	S	W
		Total	0	0	0	12	2		154	630	21	14,7						

Altogether for specialization blocks

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	0	1	12	2	231	840	28	19,6

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**
		report from training	
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	**21**	**ELR051198S** **ELR053198S** **ELR051199D** **ELR052199D** **ELR053199D**
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 learning outcomes

Type of classes	Ways of verifying assumed learning outcomes
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. Range of diploma dissertation

The diploma examination problems are available on the Faculty website.

7. Requirements concerning deadlines for crediting courses/groups of courses for all courses in particular blocks

No.	Course code	Name of course	Crediting by deadline of... (number of semester)
1			
2			
3			
4			

8. Plan of studies (attachment no. 1 to Description of the Programme of Studies)

Approved by faculty student government legislative body:

....

Date Name and surname, signature of student representative

....

Date Dean’s signature