

PROGRAMME OF STUDIES

1. Description

<i>Number of semesters: 3</i>	<i>Number ECTS points necessary to obtain qualifications: 90</i>
<i>Prerequisites:</i> <ul style="list-style-type: none"> • completed undergraduate degree in Electrical Engineering at universities in Poland or abroad, • completed undergraduate degree in related field of study, verified by the Qualification Commission. 	<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 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 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 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 effects 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 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			universit y-wide	practical	kind	type
1	ELR041311W ELR042111W ELR042511W	Numerical methods in engineering	1					K2ETK_W02 K2ETK_K02	15	30	1	0,7	T	Z			PD	OB
2	ELR041311P ELR042111P ELR042511P	Numerical methods in engineering				1		K2ETK_U02 K2ETK_K02	15	30	1	0,7	T	Z		P	PD	OB
Total			1	0	0	1	0		30	60	2	1,4						

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			universit y-wide	practical	kind	type
1	ELR043307W	Electrical Measurement Nonelectrical Values	1					K2ETK_W05 K2ETK_K02	15	60	2	1,4	T	Z			PD	OB
2	ELR043307L	Electrical Measurement Nonelectrical Values			1			K2ETK_U04 K2ETK_K02	15	30	1	0,7	T	Z		P	PD	OB
Total			1	0	1	0	0		30	90	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			universit y-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	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

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			universit y-wide	practical	kind	type
1	ELR041310W	Selected problems of circuit theory	2					K2ETK_W01	30	90	3	2,1	T	E			K	OB
2	ELR041310C	Selected problems of circuit theory		1				K2ETK_U01 K2ETK_K01	15	30	1	0,7	T	Z		P	K	OB
3	ELR042211W	Short-circuits in power systems	2					K2ETK_W03 K2ETK_K03	30	60	2	1,4	T	Z			K	OB
4	ELR043209W	Electromechanical drive systems	2					K2ETK_W04	30	90	3	2,1	T	E			K	OB
5	ELR043209L	Electromechanical drive systems			1			K2ETK_U03 K2ETK_K01	15	30	1	0,7	T	Z		P	K	OB
Total			6	1	1	0	0		120	300	10	7						

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	120	300	10	7

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			universit y-wide	practical	kind	type
1	ELR041103W	High Voltage Measurement and diagnostics of insulation	2					S2ETP_W04 K2ETK_K03 K2ETK_K06	30	60	2	1,4	T	Z			S	OB
2	ELR041104L	High Voltage Measurement and diagnostics of insulation			2			S2ETP_U07 K2ETK_K03 K2ETK_K06	30	60	2	1,4	T	Z		P	S	OB
3	ELR041105W	Lightning and overvoltage protection in buildings	1					S2ETP_W07 K2ETK_K03	15	60	2	1,4	T	Z			S	OB
4	ELR041209W	Electromagnetic materials	2					S2ETP_W03 K2ETK_K01	30	60	2	1,4	T	Z			S	OB
5	ELR041210L	Electromagnetic materials			1			S2ETP_U06 K2ETK_K01 K2ETK_K03	15	30	1	0,7	T	Z		P	S	OB
6	ELR041211W	Thermokinetics of electric and electronic devices	2					S2ETP_W09 K2ETK_K06	30	60	2	1,4	T	Z			S	OB
7	ELR041212W	Strong electrical and magnetic fields in technology	2					S2ETP_W08 K2ETK_K06	30	90	3	2,1	T	E			S	OB
8	ELR041212L	Strong electrical and magnetic fields in technology			2			S2ETP_U05 K2ETK_K06	30	60	2	1,4	T	Z		P	S	OB
9	ELR042311W	Computer Aided Design (CAD) in Energetic	2					S2ETP_W10 K2ETK_K02	30	60	2	1,4	T	Z			S	OB
10	ELR042311L	Computer Aided Design (CAD) in Energetic			1			S2ETP_U08 K2ETK_K02	15	60	2	1,4	T	Z		P	S	OB
11	ELR043210W	Automation of production processes - selected issues	1					S2ETP_W01 K2ETK_K07	15	60	2	1,4	T	Z			S	OB
12	ELR043210L	Automation of production processes - selected issues			2			S2ETP_U01 K2ETK_K07	30	60	2	1,4	T	Z		P	S	OB
13	ELR043211W	Power converters in supply and control system 1	2					S2ETP_W02 K2ETK_K01	30	90	3	2,1	T	E			S	OB
14	ELR043212W	Controlled electrical drives - selected problems	2					S2ETP_W05	30	120	4	2,8	T	E			S	OB
15	ELR043212L	Controlled electrical drives - selected problems			2			S2ETP_U02 K2ETK_K02 K2ETK_K06	30	60	2	1,4	T	Z		P	S	OB
16	ELR043213W	Computer aided modeling and design of the control system	1					S2ETP_W06	15	30	1	0,7	T	Z			S	OB
17	ELR043213L	Computer aided modeling and design of the control system			2			S2ETP_U03 K2ETK_K06	30	60	2	1,4	T	Z		P	S	OB
18	ELR043214W	Power converters in supply and control 2	1					S2ETP_W02 K2ETK_K01	15	30	1	0,7	T	Z			S	OB
19	ELR043214L	Power converters in supply and control 2			2			S2ETP_U04 K2ETK_K01	30	60	2	1,4	T	Z		P	S	OB
Total			18	0	14	0	0		480	1170	39	27,3						

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	14	0	0	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

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			universit y-wide	practical	kind	type
1	FLH051621S	Ethics in bussiness					1	K2ETK_U07 K2ETK_K06	15	60	2	1,4	T	Z	O	P	KO	W
2	PKH050421S	Social communication					1	K2ETK_U07 K2ETK_K06	15	60	2	1,4	T	Z	O	P	KO	W
3	PKH050521S	The art of public speaking					1	K2ETK_U07 K2ETK_K06	15	60	2	1,4	T	Z	O	P	KO	W
4	PRR041216W	Standardization and engineering law	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	T	Z	O		KO	W
5	PRR041217W	Engineering law	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	T	Z	O		KO	W
6	PRR041218W	Technical Standardization	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	T	Z	O		KO	W
7	ZMR042513W	Management of a Company	1					K2ETK_W06 K2ETK_K03 K2ETK_K06	15	60	2	1,4	T	Z	O		KO	W
8	ZMR042521W	Zarządzanie w energetyce	1					K2ETK_W06 K2ETK_K03 K2ETK_K06	15	60	2	1,4	T	Z	O		KO	W
Total			2	0	0	0	1		45	150	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			universit y-wide	practical	kind	type
1	JZL100709BKC	Foreign language B2+ or C1+		1				K2ETK_U05 K2ETK_K01	15	30	1	0,7	T	Z	O	P	KO	W
2	JZL100710BKC	Foreign language A1 or A2		3				K2ETK_U06 K2ETK_K01	45	60	2	1,4	T	Z	O	P	KO	W
Total			0	4	0	0	0		60	90	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			universit y-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			universit y-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	105	240	8	5,6

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			universit y-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			universit y-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			universit y-wide	practical	kind	type
1	ELR041158S ELR043158S	Diploma seminar					2	S2ETP_U10 K2ETK_K06	30	90	3	2,1	T	Z		P	S	W
2	ELR041159D ELR042159D ELR043159D	Master's thesis				12		S2ETP_U11 K2ETK_K04 K2ETK_K06	180	540	18	12,6	T	Z		P	S	W
Total			0	0	0	12	2		210	630	21	14,7						

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	210	630	21	14,7

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			universit y-wide	practical	kind	type
1	ELR041213W	Plasma technologies in industry	2					S2ETP_W12 K2ETK_K04	30	60	2	1,4	T	Z			S	W
2	ELR041214W	Electrical Low Power Supplies	2					S2ETP_W12 K2ETK_K06	30	60	2	1,4	T	Z			S	W
3	ELR041215W	Optoelectronics	2					S2ETP_W12 K2ETK_K01	30	60	2	1,4	T	Z			S	W
4	ELR041312W	Applied photovoltaics	2					S2ETP_W12 K2ETK_K06 K2ETK_K07	30	60	2	1,4	T	Z			S	W
5	ELR042313W	Conventional and Intelligent installations	2					S2ETP_W13 K2ETK_K01	30	60	2	1,4	T	Z			S	W
6	ELR042412W	Modern electrical devices	2					S2ETP_W13 K2ETK_K01	30	60	2	1,4	T	Z			S	W
7	ELR042416W	Rationalization of energy consumption	2					S2ETP_W13 K2ETK_K06	30	60	2	1,4	T	Z			S	W
8	ELR043105W	Permanent magnet electrical machines	2					S2ETP_W11	30	60	2	1,4	T	E			S	W
9	ELR043105L	Permanent magnet electrical machines			1			S2ETP_U09 K2ETK_K07	15	30	1	0,7	T	Z		P	S	W
10	ELR043106W	Field-circuit modelling of electrical machines and apparatus	2					S2ETP_W11	30	60	2	1,4	T	E			S	W
11	ELR043106L	Field-circuit modelling of electrical machines and apparatus			1			S2ETP_U09 K2ETK_K07	15	30	1	0,7	T	Z		P	S	W
12	ELR043215W	Diagnostics of industrial processes	2					S2ETP_W11	30	60	2	1,4	T	E			S	W
13	ELR043215L	Diagnostics of industrial processes			1			S2ETP_U09 K2ETK_K07	15	30	1	0,7	T	Z		P	S	W
14	ELR043216W	Power electronics converters in industry	2					S2ETP_W11 K2ETK_K06	30	60	2	1,4	T	E			S	W
15	ELR043216L	Power electronics converters in industry			1			S2ETP_U09 K2ETK_K06	15	30	1	0,7	T	Z		P	S	W
16	ELR043217W	Electrical drives vehicles	2					S2ETP_W11 K2ETK_K06 K2ETK_K07	30	60	2	1,4	T	E			S	W
17	ELR043217L	Electrical drives vehicles			1			S2ETP_U09 K2ETK_K06 K2ETK_K07	15	30	1	0,7	T	Z		P	S	W
18	ELR043308W	Measurement systems management	2					S2ETP_W11 K2ETK_K02	30	60	2	1,4	T	E			S	W
19	ELR043308L	Measurement systems management			1			S2ETP_U09 K2ETK_K02	15	30	1	0,7	T	Z		P	S	W
20	ELR043309W	Electronic Instruments in Electrometric Measurements	2					S2ETP_W11	30	60	2	1,4	T	E			S	W
21	ELR043309L	Electronic Instruments in Electrometric Measurements			1			S2ETP_U09 K2ETK_K02	15	30	1	0,7	T	Z		P	S	W
22	ELR043310W	Microprocessor techniques in measuring systems	2					S2ETP_W11 K2ETK_K06	30	60	2	1,4	T	E			S	W
23	ELR043310L	Microprocessor techniques in measuring systems			1			S2ETP_U09 K2ETK_K06	15	30	1	0,7	T	Z		P	S	W
Total			6	0	1	0	0		105	210	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				
6	0	1	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:		magister	
Number of diploma dissertation semesters	Number of ECTS points	Code	
1	21	ELR041158S ELR043158S 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	19
Number of ECTS points for optional subjects	27
Total number of ECTS points	46

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

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