PROGRAMME OF STUDIES

1. Description

Number of semesters: 3	*Number ECTS points necessary to obtain qualifications: 90*
Prerequisites: *• completed undergraduate degree in Automation and Control in Electrical Power Engineering at universities in Poland or abroad,* *• completed undergraduate degree in related field of study, verified by the Qualification Comission.*	*Upon completion of studies graduate obtains* *professional degree of: master of science, engineer* *2nd level qualifications*
Possibility of continuing studies: 3rd level studies (PhD)	*Graduate profile, employability:* *A graduate of the second level studies has an advanced knowledge and practical skills needed for creative action in the analysis, design and construction of automation circuits and systems, control and programming of industrial automation systems, and the design of decision support systems.* *A graduate of the second level studies in specialization "Automation of Machines, Vehicles, and Apparatus", has both theoretical and practical skills in the design of industrial automation systems and specialized microprocessor devices used for the control of electric drives and municipal equipment, and systems for measurement, control and diagnostic .* *A graduate of the second level studies is prepared to lead workers teams in industrial units and is well prepared for the design and research work. He has acquired habits of lifelong learning and constant professional development. He can continue education qualifying for third level studies.*
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. Fields of science and scientific disciplines to which educational effects apply:

sicence field: technical sciences, science discipline: Control Engineering and Robotics

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

Current needs of the labor market are related to the industry, which is characterized by a high degree of automation and robotics. Graduates of second level studies in Control Engineering and Robotics are trained to design and retrofit automatic control systems used in various industrial processes, with particular emphasis on automation machinery, vehicles, apparatus, and power systems. Due to acquired knowledge and practical skills in the field of industrial automation and power system automation, graduates are prepared to work in R & D centers and at decisive positions, are skilled to fulfill management duties in industry and design centers.

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

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

4.1.1.2. 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

4.1.1.3. 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

4.1.1.4. 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				
0	0	0	0	0	0	0	0	0

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	ARR041309W	Mathematical optimisation	2					K2AiR_W01	30	90	3	2,1	T	E			PD	OB
2	ARR041309L	Mathematical optimisation			1			K2AiR_U01 K2AiR_K06	15	60	2	1,4	T	Z		P	PD	OB
		Total	2	0	1	0	0		45	150	5	3,5						

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	ARR042511W	Control object identification	2					K2AiR_W04 K2AiR_K02	30	60	2	1,4	T	Z			PD	OB
2	ARR042511L	Control object identification			1			K2AiR_U03 K2AiR_K02	15	30	1	0,7	T	Z		P	PD	OB
		Total	2	0	1	0	0		45	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			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				
4	0	2	0	0	90	240	8	5,6

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	ARR042111W	Fundamentals of system modelling	1					K2AiR_W02	15	30	1	0,7	T	Z			K	OB
2	ARR042111L	Fundamentals of system modelling			1			K2AiR_U02 K2AiR_K01 K2AiR_K02	15	30	1	0,7	T	Z		P	K	OB
3	ARR042112W	Control theory	2					K2AiR_W02 K2AiR_W01 K2AiR_W03 K2AiR_K01 K2AiR_K02 K2AiR_K03 K2AiR_K04	30	90	3	2,1	T	E			K	OB
		Total	3	0	1	0	0		60	150	5	3,5						

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				
3	0	1	0	0	60	150	5	3,5

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	ARR043104W	Electrical micromachines for industrial automation	2					S2AMPU_W02 K2AiR_K06	30	60	2	1,4	T	Z			S	OB
2	ARR043218W	Controlled Electrical Drives – selected problems	2					S2AMPU_W01	30	120	4	2,8	T	E			S	OB
3	ARR043218L	Controlled Electrical Drives – selected problems			2			S2AMPU_U01 K2AiR_K06 K2AiR_K07	30	60	2	1,4	T	Z		P	S	OB
4	ARR043220W	Robots in industrial processes	1					S2AMPU_W05	15	60	2	1,4	T	Z			S	OB
5	ARR043220L	Robots in industrial processes			2			S2AMPU_U04 K2AiR_K07	30	60	2	1,4	T	Z		P	S	OB
6	ARR043221W	Application of the artificial intelligence techniques in control and diagnostics	2					S2AMPU_W06	30	90	3	2,1	T	E			S	OB
7	ARR043221L	Application of the artificial intelligence techniques in control and diagnostics			1			S2AMPU_U05 K2AiR_K06	15	30	1	0,7	T	Z		P	S	OB
8	ARR043222W	Computer aided modeling and design of control systems	2					S2AMPU_W08 K2AiR_K06	30	30	1	0,7	T	Z			S	OB
9	ARR043222P	Computer aided modeling and design of control systems				2		S2AMPU_U07 K2AiR_K06	30	90	3	2,1	T	Z		P	S	OB
10	ARR043223W	Object-oriented programming	1					S2AMPU_W09 K2AiR_K06	15	30	1	0,7	T	Z			S	OB
11	ARR043223L	Object-oriented programming			1			S2AMPU_U08 K2AiR_K06	15	60	2	1,4	T	Z		P	S	OB
12	ARR043224W	Power electronics in industry automation	2					S2AMPU_W10	30	90	3	2,1	T	E			S	OB
13	ARR043224L	Power electronics in industry automation			1			S2AMPU_U09 K2AiR_K06	15	30	1	0,7	T	Z		P	S	OB
14	ARR043225L	Programmable Logic Controllers In Industrial Automation			2			S2AMPU_U10 K2AiR_K07	30	60	2	1,4	T	Z		P	S	OB
15	ARR043227W	Wireless control and monitoring systems	2					S2AMPU_W11 K2AiR_K06	30	60	2	1,4	T	Z			S	OB
16	ARR043237W	DSP in Industrial Automation	1					S2AMPU_W04 K2AiR_K06	15	30	1	0,7	T	Z			S	OB
17	ARR043237L	DSP in Industrial Automation			2			S2AMPU_U03 K2AiR_K06	30	60	2	1,4	T	Z		P	S	OB
18	ARR043307W	Microprocessor measuring transducers	2					S2AMPU_W03 K2AiR_K01	30	60	2	1,4	T	Z			S	OB
19	ARR043307L	Microprocessor measuring transducers			1			S2AMPU_U02 K2AiR_K01	15	30	1	0,7	T	Z		P	S	OB
20	ARR043308W	Computer Control of Measurement Systems	2					S2AMPU_W07 K2AiR_K07	30	90	3	2,1	T	E			S	OB
21	ARR043308L	Computer Control of Measurement Systems			1			S2AMPU_U06 K2AiR_K07	15	30	1	0,7	T	Z		P	S	OB
		Total	19	0	13	2	0		510	1230	41	28,7						

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				
19	0	13	2	0	510	1230	41	28,7

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	FLH051621S	Ethics in bussiness					1	K2AiR_U06 K2AiR_K06	15	60	2	1,4	T	Z	O	P	KO	W
2	PKH050421S	Social communication					1	K2AiR_U06 K2AiR_K06	15	60	2	1,4	T	Z	O	P	KO	W
3	PKH050521S	The art of public speaking					1	K2AiR_U06 K2AiR_K06	15	60	2	1,4	T	Z	O	P	KO	W
4	PRR041216W	Standardization and engineering law	1					K2AiR_W06 K2AiR_K03 K2AiR_K05	15	30	1	0,7	T	Z	O		KO	W
5	PRR041217W	Engineering law	1					K2AiR_W06 K2AiR_K03 K2AiR_K05	15	30	1	0,7	T	Z	O		KO	W
6	PRR041218W	Technical Standardization	1					K2AiR_W06 K2AiR_K03 K2AiR_K05	15	30	1	0,7	T	Z	O		KO	W
7	ZMR042513W	Management of a Company	1					K2AiR_W05 K2AiR_K03 K2AiR_K06	15	60	2	1,4	T	Z	O		KO	W
8	ZMR042521W	Management in the power industry	1					K2AiR_W05 K2AiR_K03 K2AiR_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			university-wide	practical	kind	type
1	JZL100709BKC	Foreign language B2+ or C1+		1				K2AiR_U04 K2AiR_K01	15	30	1	0,7	T	Z	O	P	KO	W
2	JZL100710BKC	Foreign language A1 or A2		3				K2AiR_U05 K2AiR_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			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	105	240	8	5,6

4.2.2. List of basic sciences modules

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

4.2.2.2. 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

4.2.2.3. 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				
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

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	ARR041159D ARR042159D ARR043159D	Master's thesis				12		S2AMPU_U14 K2AiR_K04 K2AiR_K06	180	540	18	12,6	T	Z		P	S	W
2	ARR043158S	Diploma seminar					2	S2AMPU_U13 K2AiR_K06	30	90	3	2,1	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			university-wide	practical	kind	type
1	ARR041102W	Electromagnetic Compatibility	1					S2AMPU_W13 K2AiR_K03	15	30	1	0,7	T	Z			S	W
2	ARR041102L	Electromagnetic Compatibility			1			S2AMPU_U12 K2AiR_K03	15	30	1	0,7	T	Z		P	S	W
3	ARR041310W	Teleinformatic networks in the technics	1					S2AMPU_W13	15	30	1	0,7	T	Z			S	W
4	ARR041310L	Teleinformatic networks in the technics			1			S2AMPU_U12 K2AiR_K06	15	30	1	0,7	T	Z		P	S	W
5	ARR042316W	Intelligent buildings and structures installations	2					S2AMPU_W12	30	60	2	1,4	T	E			S	W
6	ARR042316P	Intelligent buildings and structures installations				1		S2AMPU_U11 K2AiR_K06	15	30	1	0,7	T	Z		P	S	W
7	ARR043228W	Control of static converters	2					S2AMPU_W12 K2AiR_K06	30	60	2	1,4	T	E			S	W
8	ARR043228L	Control of static converters			1			S2AMPU_U11 K2AiR_K06	15	30	1	0,7	T	Z		P	S	W
9	ARR043229W	Electrical drives vehicles	2					S2AMPU_W12 K2AiR_K06	30	60	2	1,4	T	E			S	W
10	ARR043229P	Electrical drives vehicles				1		S2AMPU_U11 K2AiR_K06	15	30	1	0,7	T	Z		P	S	W
11	ARR043230W	Testing and diagnostics of converter-fed drives	1					S2AMPU_W13	15	30	1	0,7	T	Z			S	W
12	ARR043230L	Testing and diagnostics of converter-fed drives			1			S2AMPU_U12 K2AiR_K07	15	30	1	0,7	T	Z		P	S	W
13	ARR043232W	Design of Power Converter	2					S2AMPU_W12 K2AiR_K01	30	60	2	1,4	T	E			S	W
14	ARR043232P	Design of Power Converter				1		S2AMPU_U11 K2AiR_K01	15	30	1	0,7	T	Z		P	S	W
15	ARR043309W	Assessment and Improvement of Power Quality	1					S2AMPU_W13 K2AiR_K07	15	30	1	0,7	T	Z			S	W
16	ARR043309L	Assessment and Improvement of Power Quality			1			S2AMPU_U12 K2AiR_K07	15	30	1	0,7	T	Z		P	S	W
		Total	4	0	3	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				
4	0	3	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**	**ARR043158S ARR041159D ARR042159D ARR043159D**
Character of diploma dissertation		
Critical elaboration of issues in the development of a detailed studying a range of specialties, problem description, and analysis of a mathematical model, computer simulations and analysis, specification and design of the device and the results of its research and development of a technical dossier.		
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	8
Number of ECTS points for optional subjects	0
Total number of ECTS points	8

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	29
Total number of ECTS points	50

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:

…….
Date

……
Name and surname, signature of student representative

…….
Date

……
Dean’s signature