Attachment no. 2 to Programme of Education

PROGRAMME OF STUDIES

1. Description

Number of semesters: 3	Number ECTS points necessary to obtain qualifications: 90
Prerequisites (particularly for second-level studies A person seeking admission on the second degree majoring in systems engineering must be qualified in the first degree in the area of technical sciences and competencies (K) necessary for the continuation of studies second degree in this direction, and in particular:	Upon completion of studies graduate obtains professional degree of: magister inżynier 1st /2nd* level qualifications
 Knowledge of mathematics and physics in order to formulate and solve simple design tasks, and understanding the basics of physical phenomena occurring in the systems corresponding to the range of completed study 1. degree. Knowledge of engineering graphics and the engineering design, including: the symbolic representation of the objects and their geometry and stereometry, technical systems and the ways in which they connect to the implementation of the adopted order, as well as the skills to: charting messages, reading technical documentation, dimensions and technical systems design of three-dimensional objects. A basic knowledge of management, marketing and protection of industrial property of: rules of operation of the company, its operation and factors affecting its functioning; management; process fundamental concepts and principles from the scope of the protection of industrial property of: and basic concepts, regularity and problems of marketing, as well as the ability to use appropriate methods and techniques to Description, analysis and interpretation of the phenomena and processes taking place in the enterprise, the application of the principles of marketing planning in the implementation of the projects and a description 	

employability: a basic knowledge of economic and technical artup and operation of o hich interoperability to ed on different technolog ds to a significant incr and efficiency. Has the and operation of inn acturing processes, pro- systems to support of and s the ability to w teams is based on a the kills in economics, mana- integrated pest mana-	a wide aspects complex chnica ies and case ir skills to ovative cesses ecision vork ir norough gemen gemen
ise ity h ufa s we y t s s cs, ach	ased on different technolog leads to a significant incre- ity and efficiency. Has the h and operation of inne- ufacturing processes, pro- systems to support de well as the ability to v y teams is based on a th d skills in economics, mana cs, integrated pest mana ach for the description, a

 ${}^{1}BK$ – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students ${}^{2}Traditional$ – enter T, remote – enter Z

³Exam – enter T, remote – enter Z ³Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) ⁴University-wide course /group of courses – enter O ⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses ⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization ⁷ Optional – enter W, obligatory – enter Ob

	design and decision-making for systems of any kind. Has the ability to smooth the use of informatics tools in programming, databases, and the use of Internet resources. The graduate is prepared to work in all economic entities and institutions in which it is desirable to use a comprehensive approach to innovation processes, especially in their start-up and operation; among others in the design and advisory units, as well as in administration.
Indicate connection with University's mission and its development strategy: Systems engineering is an innovative national direction of study, education of engineers prepared to conduct innovative technical and organizational activities on complex systems of various nature.	

2. Fields of science and scientific disciplines to which educational effects apply: *Technical sciences: computer science, automation and robotics.*

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

Training in "systems engineering" will lead to the elimination of the educational gap that resulted in a narrowly specialized training of engineers within the specialized technology, without the ability to work in interdisciplinary teams. This is also the reason for the problems in the design and implementation of innovative processes in which you must design process from the laboratory phase, by semi technical and technical, to distribution and marketing. Absence of such a comprehensive approach in education and research, cause that many scientific studies, development and patents is not implemented in practice. For example, in Lower Silesia, on nearly 50 technologies,

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 $^{{}^{3}}$ Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) 4 University-wide course /group of courses – enter O

⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

⁷ Optional – enter W, obligatory – enter Ob

which developed concepts in recent years, implementing a phase are only two. This is due to, among other things. the lack of professionals with the ability to design and conduct the entire innovation process. Experience of highly developed countries economic practices indicate that the organization of the whole infrastructure related to the carrying out of the innovation processes, including specialized design firms and their supervisory processes. The emergence of such companies requires provision of the relevant specialists, able to connect in one project many different skills and technology, which consists of modern production lines and utilities.

Training on the direction of "systems engineering" should clearly improve the entrepreneurship and innovation in the country and the region. Both the Polish economy and Lower Silesia, does not enjoy great innovation processes of production and services, it should be so stimulate already at the stage of training specialists.

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⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

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²Traditional – enter T, remote – enter Z

 $^{{}^{3}}$ Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) 4 University-wide course /group of courses – enter O

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 (min. 4 ECTS points):

No.	. Course/group	Name of course/group of courses	We	ekly	/ numt	er of	hours	Field-of-study	Numbe	er of hours	Numb	per of ECTS points	Form ² of	Way ³ of	Course/gr	oup of cou	rses	
	of courses code	(denote group of courses with symbol GK)	lec	cl	lab	pr	sem	educational effect symbol	ZZU	CNPS	total	BK classes ¹	course/group of courses	crediting	university-wide ⁴	practical ⁵	kind ⁶	type ⁷
	PRZ001154W	The Right of the European Union	1					K2_INS_W06	15	50	2	2	Т	Z			PD	
	PRZ001154C	The Right of the European Union		1				K2_INS_W06	15	50	2	2	Т	Z			PD	
		Total	1	1					30	100	4	4						

4

Altogether for general education modules

	Тс	otal number o	of hours		Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes ¹
lec	cl	lab	pr	sem				
1	1					30	100	4

¹BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

 2 Traditional – enter T, remote – enter Z

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

 $^{{}^{3}}$ Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) 4 University-wide course /group of courses – enter O

4.1.2 List of basic sciences modules

No	Course/group	Name of course/group of courses	We	ekly	numb	er of	hours	Field-of-study	Numbe	er of hours	Numb	per of ECTS points	Form ² of	Way ³ of	Course/gr	oup of cou	rses	
	of courses code	(denote group of courses with symbol GK)	lec	cl	lab	pr	sem	educational effect symbol	ZZU	CNPS	total	BK classes ¹	course/group of courses	crediting	university-wide ⁴	practical5	kind ⁶	type ⁷
	MAP008572W	Mathematics	2					K2_INS_W03 K2_INS_U09	30	80	3	3	т	E	0		PD	Ob
	MAP008572C	Mathematics		2				K2_INS_W03 K2_INS_U09	30	70	2	2	т	Z	0		PD	Ob
		Total	2	2					60	150	5	5						

4.1.2.1 Mathematics module

Altogether for basic sciences modules:

	Τc	otal number o	of hours		Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes ¹
lec	cl	lab	pr	sem				
3	3				90	250	9	9

¹BK - number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

 2 Traditional – enter T, remote – enter Z

 3 Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) 4 University-wide course /group of courses – enter O

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

4.1.3 List of main-field-of-study modules

4.1.5.1 Obligatory main-field-of-study modul	4.1.3.1	l Obligatory	main-fiela	l-of-studv	modules
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No	Course/group of courses	Name of course/group of courses (denote group of courses with symbol GK)	W	eek	ly nu hou	ımb rs	er o	of F	Field-of-study educational	Num ho	ber of ours	Nun	nber of ECTS points	Form ² of course/group	Way ³ of crediting	Course/gr	roup of co	ourses	•
	code		lec	cl	lab	pr	se	em e	effect symbol	ZZU	CNPS	total	BK classes ¹	of courses	_	university- wide ⁴	practical5	kind ⁶	type ⁷
	EKZ001165W	Macroeconomics	2					к к	(2_INS_W07 (2_INS_U12	30	100	3	3	т	E			к	Ob
	EKZ001165C	Macroeconomics		2				к к	(2_INS_W07 (2_INS_U12	30	100	3	3	т	Z			к	Ob
	INZ001801W	Mathematical modelling and similarity	1					к к к	(2_INS_W01 (2_INS_W03 (2_INS_W04 (2_INS_U06 (2_INS_U10	15	40	1	1	т	Z			к	Ob
	INZ001801P	Mathematical modelling and similarity				2		к к к	<pre>(2_INS_W01) (2_INS_W03) (2_INS_W04) (2_INS_U06) (2_INS_U10) </pre>	30	80	3	3	т	Z		Р	к	Ob

 1 BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students 2 Traditional – enter T, remote – enter Z

 3 Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) 4 University-wide course /group of courses – enter O

⁵Practical course / group of courses – enter O
 ⁶KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
 ⁷Optional – enter W, obligatory – enter Ob

INZ001805P	Mid-term project			4		K2_INS_U02 K2_INS_U07 K2_INS_U08 K2_INS_U13	60	210	7	7	т	Z	Ρ	к	Ob
						K2_INS_K02									
INZ001803S	Pro-seminar				1	K2_INS_U02 K2_INS_U05	15	60	2	2	т	Z		К	Ob
INZ001804S	Graduate seminar				1	K2_INS_U02 K2_INS_U03 K2_INS_U05	15	60	2	2	Т	z		к	Ob
INZ001802W	Advanced Problems and Methods of Systems Engineering	2				K2_INS_W02 K2_INS_W05 K2_INS_U07 K2_INS_U08 K2_INS_U11	30	60	2	2	т	Е		к	Ob
INZ001802L	Advanced Problems and Methods of Systems Engineering		2			K2_INS_W02 K2_INS_W05 K2_INS_U07	30	70	2	2	т	z	Ρ	к	Ob

¹BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students
 ²Traditional – enter T, remote – enter Z
 ³Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem)
 ⁴University-wide course /group of courses – enter O
 ⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
 ⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
 ⁷ Optional – enter W, obligatory – enter Ob

							K2_INS_U08 K2_INS_U11									
INZ001802P	Advanced Problems and Methods of Systems Engineering				1		K2_INS_W02 K2_INS_W05 K2_INS_U07 K2_INS_U08 K2_INS_U11	15	50	2	2	т	Z	Ρ	к	Ob
 	Total	5	2	2	7	2		270	830	27	27					

Altogether (for main-field-of-study modules):

	Тс	otal number o	of hours		Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes ¹
lec	cl	lab	pr	sem				
5	2	2	7	2	270	810	27	27

¹BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students ²Traditional – enter T, remote – enter Z ³Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) ⁴University-wide course /group of courses – enter O

⁵Practical course / group of courses – enter O
 ⁶KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
 ⁷Optional – enter W, obligatory – enter Ob

4.2.3 List of main-field-of-study modules

4.2.3.1 *Master Thesis* module (min. 15 ECTS points):

No	Course/group	Name of course/group of courses	We	ekly	v numb	er of	hours	Field-of-study	Numbe	r of hours	Numb	er of ECTS points	Form ² of	Way ³ of	Course/gr	oup of cou	rses	
	of courses code	(denote group of courses with symbol GK)	lec	cl	lab	pr	sem	educational effect symbol	ZZU	CNPS	total	BK classes ¹	course/group of courses	crediting	university-wide ⁴	practical ⁵	kind ⁶	type ⁷
						12		K2_INS_U01										
								K2_INS_U02										
								K2_INS_U03										
								K2_INS_U05										
	INZ001800P	Master Thesis						K2_INS_U14	180	600	20	20	Т	Z		Р	к	W
								K2_INS_U15										
								K2_INS_U16										
								K2_INS_K01										
								K2_INS_K02										
		Total				12			180	600	20	20						

4.2.3.2.Module SS II.1 – *training path "Control systems"* (*min.* 19. *pkt ECTS*):

No	Course/group	Name of course/group of courses (denote group of	Weekl	y num	per of	hours	Field-of-study	Number	r of hours	Numbe	er of ECTS points	Form ² of	Way ³ of	Course/gro	oup of cou	urses
	of courses	courses with symbol GK)	lec c	l lab	pr	sem	educational	ZZU	CNPS	total	BK classes ¹	course/group	crediting	university-wide4	practical5	kind ⁶ type ⁷
	code						effect symbol					of courses		•		• •

¹BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

 2 Traditional – enter T, remote – enter Z

 ${}^{3}Exam$ – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) ${}^{4}University$ -wide course /group of courses – enter O

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

1	INZ001806W	Inteligent Control Systems	2				30	90	3	3	Т	E		К	W
2	INZ001806L	Inteligent Control Systems		2			30	90	3	3	Т	Z	Р	К	W
3	INZ001807W	Supporting Decisions in Biomedical Systems	1			K2 INS U14	15	40	1	1	Т	Z		К	W
4	INZ001807P	Supporting Decisions in Biomedical Systems			2	K2_INS_U15	30	90	3	3	Т	Z	Ρ	К	W
5	INZ001808W	Uncertain systems	2			K2_INS_U16	30	90	3	3	Т	E		К	W
6	INZ001808P	Uncertain systems			2		30	90	3	3	Т	Z	Р	К	W
7	INZ001809W	Data mining	1				15	30	1	1	Т	Z		К	W
8	INZ001809L	Data mining		1			15	50	2	2	Т	Z	Р	K	W
		Total	6	3	4		195	570	19	19					

4.2.3.3.Module SL II.1 – training path "Logistics systems" (min. 19. pkt ECTS):

No	Course/group of courses	Name of course/group of courses (denote group of courses with symbol GK)	We	ekly r ho	um urs	ber of		Field-of-study educational	Num ho	ber of ours	Nu	mber of ECTS points	Form ² of course/group	Way ³ of crediting	Course/gr	oup of co	urses	
	code		lec	cl lat	, b	or se	m	effect symbol	ZZU	CNPS	total	BK classes ¹	of courses		university- wide ⁴	practical ⁵	kind ⁶	type ⁷
1	ZMZ001481L	Advanced logistics management in enterprise		2			ł	K2_INS_U14	30	90	3	3	Т	Z			К	W
2	ZMZ001482P	Project Management			2	2	ł	K2_INS_U15	30	90	3	3	Т	Z		Р	К	W

 1 BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students 2 Traditional – enter T, remote – enter Z

³Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) ⁴University-wide course /group of courses – enter O

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
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 ⁷ Optional – enter W, obligatory – enter Ob

3	ZMZ001483W	Optimisation methods in logistics	1			K2_INS_U16	15	40	2	2	Т	E		К	W
4	ZMZ001483P	Optimisation methods in logistics		2			30	90	3	3	Т	Z	Р	К	W
5	ZMZ001484W	Logistics Service Quality Management	2				30	70	2	2	Т	E		К	W
6	ZMZ001484S	Logistics Service Quality Management			1		15	60	2	2	Т	Z	Ρ	К	W
7	ZMZ001485W	Assessment and certification of products and management systems	2				30	70	2	2	Т	Z		к	W
8	ZMZ001485P	Assessment and certification of products and management systems		1			15	60	2	2	Т	Z	Ρ	к	W
		Total													

4.2.3.4.Module SE II.1 – training path "Energy systems" (min. 19. pkt ECTS):

No.	Course/group of courses	Name of course/group of courses (denote group of courses with symbol GK)	We	eekl	ly nui hour	mb s	er of	Field-of-study educational	Nun h	nber of ours	Nun	nber of ECTS points	Form ² of course/group	Way ³ of crediting	Course/gr	roup of co	ourses	,
	code		lec	cl	lab	pr	sem	effect symbol	ZZU	CNPS	total	BK classes ¹	of courses		university- wide ⁴	practical ⁵	kind ⁶	type ⁷
1	ESN1115	New generation energy technologies	2					K2_INS_U14	30	90	3	3	Т	E			К	W
2		Power Production System and Technology From Biomass	2					K2_INS_U15 K2_INS_U16	30	90	3	3	т	E			К	W

¹BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students ²Traditional – enter T, remote – enter Z ³Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) ⁴University-wide course /group of courses – enter O

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
 ⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
 ⁷ Optional – enter W, obligatory – enter Ob

3		Power Production System and Technology From Biomass		1				15	60	2	2	Т	Z		К	w
4		Power Production System and Technology From Biomass				1		15	60	2	2	Т	Z		к	w
5		Installations for Environmental Protection-Optymalization and Exploitation	1					15	60	2	2	т	Z		к	w
6		Installations for Environmental Protection-Optymalization and Exploitation				1		15	30	1	1	т	Z		к	w
7	ESN0150	Geothermal power Engineering	1					15	30	1	1	Т	Z		К	W
8	ESN0150	Geothermal power Engineering		1				15	30	1	1	Т	Z		К	W
9		Wind power plants	1					15	30	1	1	Т	Z		К	w
10		Heating and air-condition installation	1					15	60	2	2	Т	Z		К	W
11		Heating and air-condition installation				1]	15	30	1	1	Т	Z		К	W
		Total	8	2		3		195	570	19	19					

¹BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students
 ²Traditional – enter T, remote – enter Z
 ³Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem)
 ⁴University-wide course /group of courses – enter O
 ⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
 ⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
 ⁷ Optional – enter W, obligatory – enter Ob

4.2.3.5. Module SS II.2 – *training path "Control systems" (min. 12. pkt ECTS):*

No.	. Course/group	Name of course/group of courses (denote	Wee	ekly	y numb	er of	hours	Field-of-study	Numbe	r of hours	Numb	er of ECTS points	Form ² of	Way ³ of	Course/gr	oup of co	urses	
	of courses code	group of courses with symbol GK)	lec	cl	l lab	pr	sem	educational effect symbol	ZZU	CNPS	total	BK classes ¹	course/group of courses	crediting	university-wide ⁴	practical5	kind ⁶	type ⁷
1	INZ001816W	Implementation of Decision Support Systems						K2_INS_U14										
			1					K2_INS_U15	15	60	2	2	Т	E			к	W
								K2_INS_U16										
2	INZ001816L	Implementation of Decision Support Systems			1				15	40	2	2	Т	Z		Р	К	W
3	INZ001816P	Implementation of Decision Support Systems				2			30	100	3	3	Т	Z		Р	К	W
4	INZ001817W	Control of Computer Systems	2						30	90	3	3	Т	Z			К	W
5	INZ001817P	Control of Computer Systems				1			15	70	2	2	Т	Z		Р	K	W
_		Total	3		1	3			105	360	12	12						

4.2.3.6. Module SL II.2 – training path "Logistics systems" (min. 12. pkt ECTS):

No.	Course/group	Name of course/group of courses (denote group	Wee	ekly	numb	er of	hours?	Field-of-study	Numbe	r of hours	Numb	er of ECTS points	Form ² of	Way ³ of	Course/gr	oup of cou	irses	
	of courses code	of courses with symbol GK)	lec	cl	lab	pr	sem	educational effect symbol	ZZU	CNPS	total	BK classes ¹	course/group of courses	crediting	university-wide ⁴	practical5	kind ⁶	type ⁷
1	ZMZ001486W	Lean Production implementation in an enterprise	1					K2_INS_U14	15	40	1	1	Т	Z			К	W

¹BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

 2 Traditional – enter T, remote – enter Z

 3 Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) 4 University-wide course /group of courses – enter O

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses 6 KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

2	ZMZ001486P	Lean Production implementation in an enterprise			1		K2_INS_U15	15	60	2	2	Т	Z	Р	K	W
3	ZMZ001487P	Modeling and simulation of logistics processes			2		K2_INS_U16	30	100	4	4	Т	Z	Р	К	W
4	ZMZ001488W	Quality Costs	2					30	100	3	3	Т	Z		К	W
5	ZMZ001488S	Quality Costs				1		15	60	2	2					
		Total														

4.2.3.7. Module SE II.2 – *training path ''Energy systems'' (min. 12. pkt ECTS):*

No	Course/group	Name of course/group of courses	We	ekly	y numb	er of	hours	Field-of-study	Numbe	er of hours	Numł	per of ECTS points	Form ² of	Way ³ of	Course/gr	oup of cou	irses	
	of courses code	(denote group of courses with symbol GK)	lec	cl	lab	pr	sem	educational effect symbol	ZZU	CNPS	total	BK classes ¹	course/group of courses	crediting	university-wide ⁴	practical ⁵	kind ⁶	type ⁷
	ESN1062W	Energy systems	2					K2_INS_U14 K2_INS_U15 K2_INS_U16	30	90	3	3	т	E			к	w
	ESN1062C	Energy systems		1					15	90	3	3	Т	Z			К	W
	ESN0211W	Gas	1						15	30	2	2	Т	Z			к	W
	ESN0211C	Gas		1					15	60	1	1	Т	Z			к	W
	ESN1300W	Environmental management	2						30	90	3	3	Т	Z			К	W
		Total	5	2					105	360	12	12						

 1 BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students 2 Traditional – enter T, remote – enter Z

 3 Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) 4 University-wide course /group of courses – enter O

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
 ⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
 ⁷ Optional – enter W, obligatory – enter Ob

Altogether for main-field-of-study modules:

			-				-	
	Т	'otal number	of hours		Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes ¹
lec	cl	lab	pr	sem				
9		4	19		480	1530	51	51

4.2.4 List of specialization modules

4.2.4.1 Specialization subjects (e.g. whole specialization) modules (min. ECTS points):

No.	Course/group	Name of course/group of courses	Week	ly num	ber of	hours	Field-of-	Numbe	r of hours	Numl	ber of ECTS points	Form ² of	Way ³ of	Course/gr	oup of cou	rses	1
	of courses code	(denote group of courses with symbol GK)	lec c	l lab	pr	sem	study educational effect symbol	ZZU	CNPS	total	BK classes ¹	course/group of courses	crediting	university-wide ⁴	practical ⁵	kind ⁶	type ⁷
		Total															

A 1 4 1	e	• • • •	
Altogether	tor	specialization	modules
mogemen	101	specialization	mountes

Total number of hours	Total	Total	Total	Number of
	number	number	number	ECTS points
	of	of CNPS	of ECTS	for BK
	ZZU	hours	points	classes1
	hours			

¹BK - number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

²Traditional – enter T, remote – enter Z

³Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) ⁴University-wide course /group of courses – enter O

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

lec	cl	lab	pr	sem		

4.3 Training module (Faculty Council resolution on principles of crediting training – attachment no. ...)

Name of training					
Number of ECTS points	Number of	ECTS points for	BK classes ¹	Training crediting mode	Code
Training duration		Traini	ng objective		

4.4 Diploma dissertation module

Type of diploma dissertation	Licencjat / inżynier / magister / magister inżynier					
Number of diploma dissertation semesters	Number of ECTS points	Code				
2	20					
Character	Character of diploma dissertation projekt					
Literature survey, project, computer program, etc.						
Number of BK ¹ ECTS points	20					

5. Ways of verifying assumed educational effects

Type of classes	Ways of verifying assumed educational effects
lecture	e.g. examination, progress/final test
class	e.g. progress/final test
laboratory	e.g. pretest, report from laboratory
project	e.g. project defense
seminar	e.g. participation in discussion, topic presentation, essay

¹BK - number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

 2 Traditional – enter T, remote – enter Z

 3 Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) 4 University-wide course /group of courses – enter O

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

training	e.g. report from training
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 BK¹)

90..... ECTS

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

Number of ECTS points for obligatory subjects	9
Number of ECTS points for optional subjects	0
Total number of ECTS points	9

8. Total number of ECTS points, which student has to obtain from practical classes, including laboratory classes (enter total number of ECTS points for courses/group of courses denoted with code P)

Number of ECTS points for obligatory subjects	14
Number of ECTS points for optional subjects	20
Total number of ECTS points	34

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 (enter number of ECTS points for courses/groups of courses denoted with code OG)

¹BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

²Traditional – enter T, remote – enter Z

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

³Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) ⁴University-wide course /group of courses – enter O

8..... ECTS points

10. Total number of ECTS points, which student may obtain doing optional modules (min. 30% of total number of ECTS points) 54...... ECTS points

11. Range of diploma dissertation

1. The creation of mathematical models based on different formulated knowledge representation.

2. Neural networks and their application in systems engineering.

3. Method of fuzzy and uncertain variables in systems engineering.

4. The use of approaches in evolutionary optimization.

5. Multi criteria optimization methods.

6. The use of meta heuristic in decision-making.

7. Postulates and the dimension of invariance of dimension homogeneity.

8. Postulates and their use in the construction of the methodological model.

9. Sources of Community law: the right to primary and secondary legislation.

10. Principles of Community law.

11. The impact of competition policy and industrial policy in the enterprise market.

12. Policies, mechanisms and arrangements for the completion of the internal market of the EU.

No.	Course code	Name of course	Crediting by deadline of (number of semester)
1	EKZ001165	Macroeconomics	2
2	INZ001801	Mathematical modelling and similarity	2
3	INZ001802	Advanced Problems and Methods of Systems Engineering	2

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

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³Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem) ⁴University-wide course /group of courses – enter O

⁵Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

⁶ KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

4	PRZ001154	The Right Of The European Union	2
5	MAP008572	Mathematics	2
6	INZ001803	Pro-seminar	2
7	INZ001804	Graduate seminar	2
8	INZ001805	Mid-term project	2
9	INZ001800	Master Thesis	2
10	INZ001814	Master Thesis	3

13. Plan of studies (attachment no.)

Approved by faculty student government legislative body:

..... Date, name and surname, signature of student representative

.....

Date, Dean's signature

- ¹BK number of ECTS points assigned to hours of classes requiring direct contact of teachers with students
- 2 Traditional enter T, remote enter Z
- 3 Exam enter E, crediting enter Z. For the group of courses after the letter E or Z enter in brackets the final course form (lec, cl, lab, pr, sem) 4 University-wide course /group of courses enter O
- ⁵Practical course / group of courses enter P. For the group of courses in brackets enter the number of ECTS points assigned to practical courses 6 KO general education, PD basic sciences, K field-of-studies, S specialization
- ⁷ Optional enter W, obligatory enter Ob