PROGRAMME OF STUDIES

1. Description

Number of semesters: 7	*Number ECTS points necessary to obtain qualifications: 210*
Prerequisites (particularly for second-level studies):	*Upon completion of studies graduate obtains* *professional degree of: inzynier* *1st/2nd* level qualifications*
Possibility of continuing studies: study on 2nd level majoring in systems engineering or other related technical directions	*Graduate profile, employability:* Graduate has a basic knowledge of a wide range covering economic and technical aspects of the design, startup and operation of complex systems in which interoperability technical subsystems based on different technologies and human units leads to a significant increase in their productivity and efficiency. Has the skills to design, launch and operation of innovative, complex manufacturing processes, processes, services and systems to support decision-making, as well as the ability to work in interdisciplinary teams is based on a thorough knowledge and skills in economics, management and Informatics, integrated pest management system *approach for* the description, analysis, design and decision-making for systems of any kind.
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.	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.

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, 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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[7] Optional – enter W, obligatory – enter Ob

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. ...... ECTS points):*

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	PSZ 4104W	Psychology	2					K1_INS_W20 K1_INS_U26 K1_INS_K05	30	60	2	2	T	**Z**			KO	Ob
2	PSZ 4104S	Psychology					1	K1_INS_W20 K1_INS_U26 K1_INS_K05	15	30	1	1	T	**Z**			KO	Ob
3	EKZ1121W	Learn about the enterprise	2					K1_INS_W15 K1_INS_U22	30	60	3	3	T	**E**			KO	Ob
4	EKZ1121C	Learn about the enterprise		2				K1_INS_W15 K1_INS_U22	30	80	2	2	T	**Z**			KO	Ob
		Total	4	2			1		105	230	8	8						

4.1.1.4 *Information technologies* **module** *(min. .... ECTS points):*

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[7] Optional – enter W, obligatory – enter Ob

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	INZ 3400W	Information Technologies	1					K1_INS_U14	15	**30**	1	1	T	**Z**			KO	Ob
2	INZ 3400L	Information Technologies			1			K1_INS_U14	15	**30**	1	1	T	**Z**		P	KO	Ob
		Total	1		1				30	**60**	2	2						

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 for BK classes[1]
lec	cl	lab	pr	sem				
5	2	1		1	135	330	10	10

4.1.2 List of basic sciences modules

4.1.2.1 *Mathematics* module

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	MAP 1142W	Mathematical Analysis I	2					K1_INS_W01	30	150	5	5	T	**E**	O		PD	Ob
2	MAP 1142C	Mathematical Analysis I		2				K1_INS_W01	30	90	3	3	T	**Z**	O		PD	Ob

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[4]University-wide course /group of courses – enter O

[5]Practical 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

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol GK)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
3	INZ 3402W	Algebra and Analytic Geometry	2					K1_INS_W01	30	70	2	2	T	**E**	O		PD	Ob
4	INZ 3402C	Algebra and Analytic Geometry		1				K1_INS_W01	15	50	2	2	T	**Z**	O		PD	Ob
5	MAP 1156W	Mathematical Analysis II	2					K1_INS_W01	30	120	4	3	T	**E**	O		PD	Ob
6	MAP 1156C	Mathematical Analysis II		2				K1_INS_W01	30	90	3	3	T	**Z**	O		PD	Ob
7	INZ 3405W	Discrete mathematics for engineers	2					K1_INS_W01	30	60	2	3	T	**E**			PD	Ob
8	INZ 3405C	Discrete mathematics for engineers		2				K1_INS_W01	30	60	2	2	T	**Z**			PD	Ob
		Total	8	7					225	620	22	22						

4.1.2.2 *Physics* module

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	FZP 1005W	General Physics I	2					K1_INS_W02 K1_INS_U08	30	120	4	4	T	**E**	O		PD	Ob

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[4]University-wide course /group of courses – enter O
[5]Practical 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

No.	Course/group of courses	Name of course/group of courses	lec	cl	lab	pr	sem	Field-of-study educational	ZZU	CNPS	total	BK classes[1]	Form of course/group	Way of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
2	FZP 1005C	General Physics I		1				K1_INS_W02 K1_INS_U08	15	30	1	2	T	**Z**	O	P	PD	Ob
3	FZP 1006W	General Physics II	2					K1_INS_W02 K1_INS_U08	30	90	3	3	T	**E**	O		PD	Ob
4	FZP 1006L	General Physics II			1			K1_INS_W02 K1_INS_U08	15	60	2	2	T	**Z**	O	P	PD	Ob
		Total	4	1	1				90	330	11	11						

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 for BK classes[1]
lec	cl	lab	pr	sem				
12	8	1			315	950	33	33

4.1.3 List of main-field-of-study modules

4.1.3.1 *Obligatory main-field-of-study* modules

No..	Course/group of courses	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational	Number of hours		Number of ECTS points		Form[2] of course/group	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]

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[4]University-wide course /group of courses – enter O

[5]Practical 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

№	code		effect symbol						of courses						
1	EKZ 2109W	Computer aided financial analysis	2				K1_INS_W16 K1_INS_U23	30	40	1	1	T	E			K	Ob
2	EKZ 2109L	Computer aided financial analysis		1		K1_INS_W16 K1_INS_U23	15	40	1	1	T	Z		P	K	Ob
3	EKZ 2109P	Computer aided financial analysis			1	K1_INS_W16 K1_INS_U23	15	40	2	2	T	Z		P	K	Ob
4	MAZ 3101W	Operational research	2			K1_INS_W03 K1_INS_W07 K1_INS_U07 K1_INS_U09 K1_INS_U12 K1_INS_U13	30	90	3	3	T	E			K	Ob
5	MAZ 3101C	Operational research		2		K1_INS_W03 K1_INS_W07 K1_INS_U07 K1_INS_U09 K1_INS_U12	30	90	3	3	T	Z			K	Ob

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№	Kod	Nazwa					Efekty	ZZU	CNPS	ECTS	BK	Forma	Sposób	P		Grupa
							K1_INS_U13									
6	ISZ 4101W	Work safety and ergonomics	1				K1_INS_W18 K1_INS_U24	15	20	1	1	T	**Z**		K	Ob
7	ISZ 4101L	Work safety and ergonomics		1			K1_INS_W18 K1_INS_U24	15	40	2	2	T	**Z**	P	K	Ob
8	INZ 3401W	Engineering drawing, graphics	1				K1_INS_W13 K1_INS_U20	15	60	2	2	T	**Z**		K	Ob
9	INZ 3401C	Engineering drawing, graphics		1			K1_INS_W13 K1_INS_U20	15	60	2	2	T	**Z**		K	Ob
10	INZ 3410W	System identification	2				K1_INS_W04 K1_INS_W05 K1_INS_U07 K1_INS_U08 K1_INS_U11	30	90	3	3	T	**E**		K	Ob
11	INZ 3410L	System identification		2			K1_INS_W04 K1_INS_W05 K1_INS_U07 K1_INS_U08	30	90	3	3	T	**Z**	P	K	Ob

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[7] Optional – enter W, obligatory – enter Ob

									BK¹		²	³		⁴	⁵	⁶	⁷
								K1_INS_U11									
12	ZMZ 2161W	Marketing and innovation	2					K1_INS_W12 K1_INS_W19 K1_INS_U25	30	90	3	3	T	**E**		K	Ob
13	ZMZ 2161S	Marketing and innovation				1		K1_INS_W12 K1_INS_W19 K1_INS_U25	15	50	1	1	T	**Z**		K	Ob
14	ZMZ 2161C	Marketing and innovation		1				K1_INS_W12 K1_INS_W19 K1_INS_U25	15	50	2	2	T	**Z**		K	Ob
15	INZ 3404W	Dynamic Systems Models	2					K1_INS_W01 K1_INS_W03 K1_INS_U07 K1_INS_U09 K1_INS_U11	30	50	2	2	T	**E**		K	Ob
16	INZ 3404C	Dynamic Systems Models		2				K1_INS_W01 K1_INS_W03 K1_INS_U07	30	50	1	1	T	**Z**		K	Ob

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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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							K1_INS_U09										
							K1_INS_U11										
17	INZ 3404L	Dynamic Systems Models		2			K1_INS_W01 K1_INS_W03 K1_INS_U07 K1_INS_U09 K1_INS_U11	30	50	2	2	T	**Z**		P	K	Ob
18	PRZ 4125W	Protecting intellectual property	1				K1_INS_W15 K1_INS_U22	15	30	2	2	T	**Z**			K	Ob
19	INZ 3407W	System optimization	2				K1_INS_W06 K1_INS_W07 K1_INS_U07 K1_INS_U12	30	60	2	2	T	**E**			K	Ob
20	INZ 3407W	System optimization		2			K1_INS_W06 K1_INS_W07 K1_INS_U07 K1_INS_U12	30	60	2	2	T	**Z**		P	K	Ob
21	FBZ 1144W	Foundations of accounting for engineers	2				K1_INS_W16	30	80	3	3	T	**Z**			K	Ob

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			BK														
							K1_INS_U23										
22	FBZ 1144C	Foundations of accounting for engineers		2			K1_INS_W16 K1_INS_U23	30	70	2	2	T	**Z**			K	Ob
23	INZ 3413W	Foundations of Decision and Control Theory	2				K1_INS_W06 K1_INS_W07 K1_INS_W09 K1_INS_U07 K1_INS_U11 K1_INS_U13 K1_INS_U16	30	50	2	2	T	**E**			K	Ob
24	INZ 3413C	Foundations of Decision and Control Theory		1			K1_INS_W06 K1_INS_W07 K1_INS_W09 K1_INS_U07 K1_INS_U11 K1_INS_U13 K1_INS_U16	15	40	1	1	T	**Z**			K	Ob
25	INZ 3413L	Foundations of Decision and Control Theory			2		K1_INS_W06	30	60	2	2	T	**Z**		P	K	Ob

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No.	Code	Course name					Learning outcomes											
							K1_INS_W07 K1_INS_W09 K1_INS_U07 K1_INS_U11 K1_INS_U13 K1_INS_U16											
26	EKZ 1122W	Legal and economic environment of enterprises	2				K1_INS_W15 K1_INS_U22 K1_INS_K02 K1_INS_K06	30	80	3	3	T	**Z**			K	Ob
27	EKZ 1122C	Legal and economic environment of enterprises		1			K1_INS_W15 K1_INS_U22 K1_INS_K02 K1_INS_K06	15	40	1	1	T	**Z**			K	Ob
28	INZ 3406W	Engineering Design	3				K1_INS_W14 K1_INS_U18 K1_INS_U19	45	90	2	2	T	**Z**			K	Ob
29	INZ 3406C	Engineering Design		1			K1_INS_W14	15	30	2	2	T	**Z**			K	Ob

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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
[5]Practical 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

No	Code	Course name					Effects	h	h	BK	BK	Trad	Exam	Univ	Pract	Group	Opt
							K1_INS_U18 K1_INS_U19										
30		Information systems design	1				K1_INS_U06 K1_INS_U15	15	30	1	1	T	**Z**			K	Ob
31		Information systems design		2			K1_INS_U06 K1_INS_U15	30	60	2	2	T	**Z**		P	K	Ob
32	MAZ1140W	Statistics and econometrics	2				K1_INS_W04 K1_INS_U10 K1_INS_U11	30	70	2	2	T	**E**			K	Ob
33	MAZ1140L	Statistics and econometrics		1			K1_INS_W04 K1_INS_U10 K1_INS_U11	15	50	2	2	T	**Z**		P	K	Ob
34	INZ 3409S	Innovation and technology strategies			2		K1_INS_W12 K1_INS_W14 K1_INS_U21	30	40	2	2	T	**Z**			K	Ob
35	INZ 3412W	Computer simulation	1				K1_INS_W04 K1_INS_U11	15	30	1	1	T	**Z**			K	Ob
36	INZ 3412L	Computer simulation		2			K1_INS_W04	30	90	3	3	T	**Z**		P	K	Ob

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No.	Code	Course name	W	C	L	P	S	Learning outcomes										
								K1_INS_U11										
37	INZ 3408W	Database systems	2					K1_INS_W08 K1_INS_U14	30	100	3	3	T	**Z**			K	Ob
38	INZ 3408L	Database systems			2			K1_INS_W08 K1_INS_U14	30	90	3	3	T	**Z**		P	K	Ob
39	INZ 4314W	Artificial intelligence	2					K1_INS_W10 K1_INS_U17	30	60	2	2	T	**E**			K	Ob
40	INZ 4314L	Artificial intelligence			2			K1_INS_W10 K1_INS_U17	30	60	2	2	T	**Z**		P	K	Ob
41	INZ 3411W	Internet technologies	1					K1_INS_U15	15	50	2	2	T	**Z**			K	Ob
42	INZ 3411L	Internet technologies			3			K1_INS_U15	45	100	3	3	T	**Z**		P	K	Ob
43	INZ 3402W	Introduction to Systems Engineering	2					K1_INS_W17 K1_INS_U01	30	60	2	2	T	**Z**			K	Ob
44	INZ 3402S	Introduction to Systems Engineering					1	K1_INS_W17 K1_INS_U01	15	40	1	1	T	**Z**			K	Ob
45	INZ 3403W	Introduction to programming	2					K1_INS_W08 K1_INS_U14	30	50	1	1	T	**Z**			K	Ob

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[4]University-wide course /group of courses – enter O

[5]Practical 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

46	INZ 3403L	Introduction to programming			2			K1_INS_W08 K1_INS_U14	30	70	3	3	T	**Z**		P	K	Ob
47	ZMZ3197W	Project management	2					K1_INS_W17	30	60	2	2	T	**Z**			K	Ob
48	ZMZ 3198W	Systems Engineering	1					K1_INS_W17 K1_INS_U02 K1_INS_U18 K1_INS_K03 K1_INS_K04	15	50	1	1	T	**E**			K	Ob
49	ZMZ 3198S	Systems Engineering					2	K1_INS_W17 K1_INS_U02 K1_INS_U18 K1_INS_K03 K1_INS_K04	30	70	3	3	T	**Z**			K	Ob
		Total	40	11	24	1	6		1230	2890	99	99						

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

Total number of hours	Total number of ZZU	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes[1]

[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

[5]Practical 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

				hours				
lec	cl	lab	pr	sem				
40	11	24	1	6	1230	2890	99	99

4.2 List of optional modules

4.2.1 List of general education modules

4.2.1.1 Liberal-managerial subjects modules *(min. ...... ECTS points):*

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
		Total																

4.2.1.2 *Foreign languages* module *(min. .... ECTS points):*

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]

[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

[5]Practical 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

		English		4				K1_INS_U03 K1_INS_U06	60	**60**	2	2	T	**Z**	O		KO	W
		English		4				K1_INS_U03 K1_INS_U06	60	90	3	3	T	**Z**	O		KO	W
		Total		8					120	**150**	5	5						

4.2.1.3 Sporting classes module *(min. .... ECTS points):*

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
		Sports activities		2				K1_INS_K07	30	30	1	1	T	**Z**	O		KO	W
		Total		2					30	30	1	1						

4.2.1.4 *Information technologies* module *(min. .... ECTS points):*

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]

[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

[5]Practical 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

Total																		

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 for BK classes[1]
lec	cl	lab	pr	sem				

4.2.2 List of basic sciences modules

4.2.2.1 *Mathematics* module *(min. .... ECTS points):*

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
		Total																

4.2.2.2 *Physics* module *(min. .... ECTS points):*

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]

[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

[5]Practical 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

No.	Course/group of courses code	Name of course/group of courses																		
		Total																		

4.2.2.3 *Chemistry* module *(min. .... ECTS points):*

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
		Total																

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 for BK classes[1]
lec	cl	lab	pr	sem				

4.2.3 List of main-field-of-study modules

4.2.3.1 Module *Bachelor Thesis (min. 10 pkt ECTS): diploma*

No.	Course/group	Name of course/group of courses	Weekly number of hours	Field-of-study	Number of hours	Number of ECTS points	Form[2] of	Way[3] of	Course/group of courses

[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

[5]Practical 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

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]
	Bachelor Thesis				4		K1_INS_U01 K1_INS_U19 K1_INS_K01 K1_INS_K04 K1_INS_K06	60	390	11	11	T	**Z**		P	K	W
	Total				4			60	390	11	11						

………..

4.2.3.2 Module *Practice (min. ...... pkt ECTS):diploma*

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
K		Practice						K1_INS_K04 K1_INS_K05 K1_INS_K06	0	160	5	5	T	**Z**		P	K	W
		Total							0	160	5	5						

4.2.3.3 Module *Team project engineering (min. ...... pkt ECTS):*

[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
[5]Practical 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

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
	INZ 3416L	Collective Engineering Project			3			K1_INS_W12 K1_INS_U01 K1_INS_U02 K1_INS_U03 K1_INS_U04 K1_INS_U18 K1_INS_U19 K1_INS_K01 K1_INS_K02 K1_INS_K03 K1_INS_K04 K1_INS_K06	45	120	4	4	T	**Z**		P	K	W
	INZ 3416P	Collective Engineering Project				2		K1_INS_W12 K1_INS_U01 K1_INS_U02 K1_INS_U03 K1_INS_U04	30	120	4	4	T	**Z**		P	K	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

[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

[5]Practical 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

						K1_INS_U18											
						K1_INS_U19											
						K1_INS_K01											
						K1_INS_K02											
						K1_INS_K03											
						K1_INS_K04											
						K1_INS_K06											
INZ 3416S	Collective Engineering Project					1	K1_INS_W12 K1_INS_U01 K1_INS_U02 K1_INS_U03 K1_INS_U04 K1_INS_U18 K1_INS_U19 K1_INS_K01 K1_INS_K02 K1_INS_K03 K1_INS_K04 K1_INS_K06	15	30	1	1	T	**Z**			K	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
[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
[5]Practical 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

No..	Course/group of courses code	Name of course/group of courses	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2]	Way[3]	university-wide[4]	practical[5]	kind[6]	type[7]
		Total		3	2	1			90	270	9	9						

4.2.3.4 Module SS I.1 – *training path "Control systems"* (min. 8 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
1	INZ003215W	Bases of electronics and Electrical Engineering	1						15	40	1	1	T	**Z**			K	W
2	INZ003215C	Bases of electronics and Electrical Engineering		1				K1_INS_W11	15	40	1	1	T	**Z**			K	W
3	INZ003215L	Bases of electronics and Electrical Engineering			1			K1_INS_U05	15	40	2	2	T	**Z**		P	K	W
4	INZ003200W	Numerical methods	1					K1_INS_U06 K1_INS_U19	15	40	2	2	T	**Z**			K	W
5	INZ003200L	Numerical methods			2				30	80	2	2	T	**Z**		P	K	W
		Total	2	1	3				90	240	8	8						

4.2.3.5 Module SSU I.1 – *training path "Service-based computer communication systems"* (min. 8 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-	practical[5]	kind[6]	type[7]

[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

[5]Practical 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

No.	Course/group of courses code	Name of course/group of courses	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	Form of course/group of courses	Way of crediting	university-wide	practical	kind	type
															wide			
1		Methods of requirements analysis for service-based systems	2					K1_INS_W11	30	80	3	3	T	**Z**			K	W
2		Methods of requirements analysis for service-based systems		2				K1_INS_U05	30	80	2	2	T	**Z**			K	W
3		Metrology and measurement tools for sensor systems I	2					K1_INS_U06 K1_INS_U19	30	80	3	3	T	**Z**			K	W
		Total	4	2					90	240	8	8						

4.2.3.6 Module PB I.1 – *training path "Biotechnological processes"* (min. 8 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
									Number of hours		Number of ECTS points				Course/group of courses			
1	CHC013002W	Principles of organic chemistry	2					K1_INS_W11	30	90	4	4	T	**Z**			K	W
2	CHC013002	Principles of organic chemistry			2			K1_INS_U05	30	60	2	2	T	**Z**		P	K	W
3		Biology I	2					K1_INS_U06 K1_INS_U19	30	90	2	2	T	**Z**			K	W
		Total	4		2				90	240	8	8						

4.2.3.7 Module SL I.1 – *training path "Logistics systems"* (min. 8 pkt ECTS):

[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

[5]Practical 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

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	**ZMZ1579W**	Operations Management	1					K1_INS_W11	15	40	2	2	T	**Z**			K	W
2	**ZMZ1579C**	Operations Management		1					15	40	1	1	T	**Z**			K	W
3	**ZMZ1578W**	The organization of logistics systems	1					K1_INS_U05	15	40	1	1	T	**Z**		P	K	W
4	**ZMZ1578P**	The organization of logistics systems				1		K1_INS_U06	15	40	2	2	T	**Z**		P	K	W
5	**ZMZ1577W**	Foundations of Logistic	1					K1_INS_U19	15	40	1	1	T	**Z**			K	W
6	**ZMZ1577S**	Foundations of Logistic					1		15	40	1	1	T	**Z**			K	W
		Total	3	1	0	1	1		90	240	8	8						

4.2.3.8 Module SE I.1 – *training path "Energy systems"* (min. 8 pkt ECTS):

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	ESN 0370W	Power engineering machinery	2					K1_INS_W11	30	90	3	3	T	**Z**			K	W
2	ESN 0660W	Fundamentals of Electronics	1					K1_INS_U05 / K1_INS_U06	15	30	1	1	T	**Z**			K	W
3	ESN 0660L	Fundamentals of Electronics			1			K1_INS_U19	15	30	1	1	T	**Z**		P	K	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

[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

[5]Practical 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	MSN 1010W	Combustion and fuels	2						30	90	3	3	T	**Z**			K	W
		Total	5		1				90	240	8	8						

4.2.3.9 Moduł SS I.2 – *training path "Control systems"* (min. 8 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	INZ003203W	Pattern recognition	1					K1_INS_W11	15	60	2	2	T	**Z**			K	W
2	INZ003203WL	Pattern recognition			2			K1_INS_U05	30	60	2	2	T	**Z**		P	K	W
3	INZ003204W	Learning Systems	1					K1_INS_U06	15	60	2	2	T	**Z**			K	W
4	INZ003204L	Learning Systems			2			K1_INS_U19	30	60	2	2	T	**Z**		P	K	W
		Total																

4.2.3.10 Module SSU I.2 – *training path "Service-based computer communication systems"* (min. 8 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
		Design of efficient algorithms of data processing in networked systems of	2					K1_INS_W11	30	80	2	2	T	**Z**			K	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

[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

[5]Practical 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

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
		services, things and media						K1_INS_U05										
		Design of efficient algorithms of data processing in networked systems of services, things and media			2			K1_INS_U06 K1_INS_U19	30	80	3	3	T	**Z**		P	K	W
		Metrology and measurement tools for sensor systems II			2				30	80	3	3	T	**Z**		P	K	W
		Total	4	0	2				90	240	8	8						

4.2.3.11 Module PB I.2 – *training path "Biotechnological processes"* (min. 8 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
1	TCC 014001	Fundamentals of chemical technology	2					K1_INS_W11 K1_INS_U05	30	90	3	3	T	**Z**			K	W
2	BTC 014001	Biotechnological methods in environmental protection	2					K1_INS_U06 K1_INS_U19	30	60	3	3	T	Z			K	W
3		Mathematical modeling of biotechnological processes			2				30	90	2	2	T	Z			K	W
		Total	4	**2**					90	240	8	8						

[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
[5]Practical 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

4.2.3.12 Module SL I.2 – *training path "Logistics systems"* (min. 8 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
1	ZMZ002165W	Logistics Management in Enterprise	2					K1_INS_W11	30	80	2	2	T	**Z**			K	W
2	ZMZ002165L	Logistics Management in Enterprise			1			K1_INS_U05	15	40	1	1	T	**Z**		P	K	W
3	ZMZ002165P	Logistics Management in Enterprise				1		K1_INS_U06	15	60	2	2	T	**Z**		P	K	W
4	FBZ001186W	The cost in logistics	1					K1_INS_U19	15	30	2	1	T	**Z**			K	W
5	FBZ001186C	The cost in logistics		1					15	30	1	2	T	**Z**		P	K	W
		Total	3	1	1	1			90	240	8	8						

4.2.3.13 Module SE I.2 – *training path "Energy systems"* (min. 8 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
		Combustion and fuels			1			K1_INS_W11	15	60	2	2	T	**Z**		P	K	W
	MSN0210	Ecology	2					K1_INS_U05	30	90	3	3	T	**Z**			K	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
[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
[5]Practical 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

4.2.3.14 Module SS I.3 – *training path "Control systems"* (min. 6 *pkt ECTS*):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
	INZ003207W	Modeling and simulation of control systems	1					K1_INS_W11	15	60	2	2	T	**Z**			K	W
	INZ003207L	Modeling and simulation of control systems			3			K1_INS_U05 K1_INS_U06 K1_INS_U19	45	120	4	4	T	**Z**		P	K	W
		Total	1		3				60	180	6	6						

4.2.3.15 Module SSU I.3 – *training path "Service-based computer communication systems"* (min. 6 *pkt ECTS*):

[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

[5]Practical 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

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1		Design of networked systems of services, things and media	1					K1_INS_W11 K1_INS_U05	15	50	2	2	T	**Z**			K	W
2		Design of networked systems of services, things and media			2			K1_INS_U06 K1_INS_U19	30	80	3	3	T	**Z**		P	K	W
3		Services-based systems for e-economy	1						15	50	1	1	T	**Z**			K	W
		Total	2		2				60	180	6	6						

4.2.3.16 Module PB I.3 – *training path "Biotechnological processes"* (min. 6 *pkt ECTS*):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1		Bioinformatics			2			K1_INS_W11	30	90	3	3	T	Z			K	W
2		Biotechnology	2					K1_INS_U05 K1_INS_U06 K1_INS_U19	30	90	3	3	T	Z			K	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

[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

[5]Practical 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

							Total				2	**2**					60	180	6		6								

4.2.3.17 Module SL I.3 – *training path "Logistics systems"* (min. *6* pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
	ZMZ1580W	Supply Chain Management	1					K1_INS_W11 K1_INS_U05 K1_INS_U06 K1_INS_U19	15	40	2	1	T	**Z**			K	W
	ZMZ1580S	Supply Chain Management					1		15	40	1	2	T	**Z**		P	K	W
	IEZ1213W	Information systems in logistics	1						15	40	1	1	T	**Z**			K	W
	IEZ1213P	Information systems in logistics				1			15	60	2	2	T	**Z**			K	W
		Total	2	0	0	1	1		60	180	6	6						

[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

[5]Practical 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

4.2.3.18 Module SE I.3 – *training path "Energy systems"* (min. 6 *pkt ECTS):*

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
								Weekly number of hours	Number of hours		Number of ECTS points				Course/group of courses			
1	ESN 0171W	Power Engineering and Environmental	1					K1_INS_W11 K1_INS_U05 K1_INS_U06 K1_INS_U19	15	60	2	2	T	**Z**			K	W
2	ESN 1090W	Flue-Gas Cleaning Techniques	2						30	60	2	2	T	**Z**			K	W
3	ESN 1090C	Flue-Gas Cleaning Techniques		1					10	60	2	2	T	**Z**			K	W
		Total	3	1					60	180	6	6						

4.2.3.19 Module SS I.4 – *training path "Control systems"* (min. 9 *pkt ECTS):*

No.	Course/group	Name of course/group of courses (denote	Weekly number of hours	Field-of-study	Number of hours	Number of ECTS points	Form[2] of	Way[3] of	Course/group of courses

[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
[5]Practical 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

of courses code	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]
INZ003425W	Advanced Decision Support Methods i	2					K1_INS_W11	30	50	2	2	T	**Z**			K	W
INZ003425P	Advanced Decision Support Methods				2		K1_INS_U05	30	80	3	3	T	**Z**		P	K	W
INZ003429W	Real-time systems	2					K1_INS_U06	30	40	1	1	T	**Z**			K	W
INZ003429L	Real-time systems			2			K1_INS_U19	30	90	3	3	T	**Z**		P	K	W
	Total	4		2	2			120	260	9	9						

4.2.3.20 Module SSU I.4 – *training path "Service-based computer communication systems"* (min. 9 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1		Design and implementation of Web systems	2					K1_INS_W11	30	50	2	2	T	**Z**			K	W
2		Design and implementation of Web systems				4		K1_INS_U05	60	160	5	5	T	**Z**		P	K	W
3		Quality service-based computer communication systems	2					K1_INS_U06 K1_INS_U19	30	50	2	2	T	**Z**			K	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

[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

[5]Practical 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

		Total	4			4			120	260	9	9						

4.2.3.21 Module PB I.4 – *training path "Biotechnological processes"* (min. 9 pkt ECTS):

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	BTC 010006	Bioprocess engineering	2					K1_INS_W11 K1_INS_U05	30	80	3	3	T	**Z**			K	W
2		Design of biologically active compounds	2					K1_INS_U06	30	60	2	2	T	Z			K	W
3	CHC010007W	Chemistry of natural products	2					K1_INS_U19	30	60	2	2	T	**Z**			K	W
4	BTC005009P	Design of biotechnological processes				2			30	60	2	2	T	**Z**			K	W
		Total																

4.2.3.22 Module SL I.4 – *training path "Logistics systems"* (min. 9 pkt ECTS):

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	**IEZ1214W**	Simulation modeling in logistics	1					K1_INS_W11	15	30	1	1	T	**Z**			K	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
[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
[5]Practical 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

			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes						kind	type
2	**IEZ1214L**	Simulation modeling in logistics			1			K1_INS_U05	15	30	1	1	T	**Z**				K	W
3	ZMZ001489W	Quality Management Systems	1					K1_INS_U06	15	40	2	2	T	**Z**				K	W
4	ZMZ001489S	Quality Management Systems					1	K1_INS_U19	15	40	1	1	T	**Z**				K	W
5	**ZMZ1581W**	Quality management - basics	2						30	60	2	2	T	**Z**				K	W
6	**ZMZ1581C**	Quality management - basics		2					30	60	2	2	T	**Z**				K	W
		Total																	

4.2.3.23 Module SE I.4 – *training path "Energy systems"* (min. 9 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses		kind[6]	type[7]
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]		
1		Cryogenics and Gas Technologies in Power Engineering	2						30	60	3	3	T	**Z**			K	W
2		Cryogenics and Gas Technologies in Power Engineering		1				K1_INS_W11	15	30	1	1	T	**Z**			K	W
3		Cryogenics and Gas Technologies in Power Engineering			1			K1_INS_U05	15	30	1	1	T	**Z**		P	K	W
4		Power distribution	2					K1_INS_U06	30	60	2	2	T	**Z**			K	W
5		Heat pumps and solar collectors	1					K1_INS_U19	15	30	1	1	T	**Z**			K	W
6		Heat pumps and solar collectors			1				15	30	1	1	T	**Z**			K	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

[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

[5]Practical 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

		Total	5	1	2				120	260	9	9						

4.2.3.24 Module SSU I.5 – *training path "Service-based computer communication systems"* (min. 6 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
		Design and implementation of advanced web systems	1					K1_INS_W11	15	30	1	1	T	**Z**			K	W
		Design and implementation of advanced web systems				2		K1_INS_U05 K1_INS_U06	30	120	4	4	T	**Z**		P	K	W
		Internet of things, media and services	1					K1_INS_U19	15	30	1	1						
		Total	2			2			60	180	6	6						

4.2.3.25 Module SS I.5 – *training path "Control systems"* (min. 6 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]

[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
[5]Practical 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

No.	Course/group of courses code	Name of course/group of courses	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2]	Way[3]	university-wide[4]	practical[5]	kind[6]	type[7]
1	INZ003213W	Embedded systems	1					K1_INS_W11	15	60	2	2	T	**Z**			K	W
2	INZ003213p	Embedded systems				3		K1_INS_U05 K1_INS_U06 K1_INS_U19	45	120	4	4	T	**Z**		P	K	W
		Total	1			3			60	180	6	6						

4.2.3.26 Module PB I.5 – *training path "Biotechnological processes"* (min. 6 pkt ECTS):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes[1]	Form[2] of course/group of courses	Way[3] of crediting	university-wide[4]	practical[5]	kind[6]	type[7]
	BTC005012W	Bioorganic chemistry	2					K1_INS_W11	30	90	3	3	T	**Z**			K	W
		The ethical aspects of biotechnology	2					K1_INS_U05 K1_INS_U06 K1_INS_U19	30	90	3	3	T	Z			K	W
		Total	4		2				60	180	6	6						

4.2.3.27 Module SL I.5 – *training path "Logistics systems"* (min. 6 pkt ECTS):

[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

[5]Practical 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

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
	ZMZ004132W	Quality management tools	2					K1_INS_W11	30	90	3	3	T	**Z**			K	W
	ZMZ004132C	Quality management tools		1				K1_INS_U05	15	50	2	2	T	**Z**			K	W
	ZMZ004132S	Quality management tools					1	K1_INS_U06 K1_INS_U19	15	40	1	1	T	**Z**			K	W
		Total	2	1			1		60	180	6	6						

4.2.3.28 Module SE I.5 – *training path "Energy systems"* (min. *6* pkt ECTS):

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1		Energy management	2					K1_INS_W11 K1_INS_U05 K1_INS_U06 K1_INS_U19	30	90	3	3	T	**Z**			K	W
2		Thermal power stations	2						30	90	3	3	T	**Z**			K	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

[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

[5]Practical 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

		Total	4					60	180	6	6						

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 for BK classes[1]
lec	cl	lab	pr	sem				
5	0	1	8	2	240	900	30	30

4.2.4 List of specialization modules

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

Name of training		*direction practice*		
Number of ECTS points	**Number of ECTS points for BK classes[1]**		**Training crediting mode**	**Code**
5	5		*practice report*	
Training duration	**Training objective**			
4 weeks	*Read the actual technical and organizational systems in a company in which the practice is carried out and, in particular, issues relating to the pursuit of technological processes and control of human teams*			

4.4 Diploma dissertation module

[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

[5]Practical 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

Type of diploma dissertation	Licencjat / inżynier / magister / magister inżynier	
Number of diploma dissertation semesters	**Number of ECTS points**	**Code**
1	11	
Character of diploma dissertation		
Literature survey, project, computer program, etc. *projekt*		
Number of BK[1] ECTS points	11	

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
training	e.g. report from training
diploma dissertation	prepared diploma dissertation

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

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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

[5]Practical 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

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[1])

        210……. ECTS

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

Number of ECTS points for obligatory subjects …….	33
Number of ECTS points for optional subjects ….	0
Total number of ECTS points	33

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 …….	35
Number of ECTS points for optional subjects ….	46
Total number of ECTS points	81

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)

        34……. ECTS points

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

        68……. ECTS points

11. Range of diploma dissertation

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

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[5]Practical 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

4. Range-wide exam

1. *Models in the States.*
2. *Quality evaluation and comparison of models.*
3. *Analytical methods of optimization.*
4. *Numerical optimization methods without and with limitations.*
5. *Parameter estimation methods for dynamic systems.*
6. *Methods of identifying static objects in terms of probability.*
7. *Planning for innovation processes.*
8. *Strategies for companies.*
9. *Singapore international monetary exchange method and application of linear programming.*
10. *Scheduling and issue of a salesman.*
11. *Modeling method of discrete systems.*
12. *Statistical analysis of the results of the simulation.*
13. *The concept of the adjustment and its basic properties.*
14. *Methods and algorithms inspired by nature.*
15. *Methods and being formalist representation and processing of knowledge.*
16. *Machine learning and its application.*
17. *The projection principle, and dimensioning sections.*
18. *The life cycle of an enterprise.*
19. *Resources, potential and capital enterprises (material, technical, human resources, financial, informational)-their meaning and principles of shaping.*
20. *Objectives and functions of management.*
21. *Organizational structure-considerations and directions of evolution.*
22. *The essence and the concept of the rule of law. The functions of the law.*
23. *Legal relations. Subjects of the law.*
24. *The basic structure of the market: excellent competition, monopolistic competition, oligopoly, monopoly.*
25. *The basic elements of the market: supply and demand characteristics and the factors shaping demand and supply.*
26. *Assets and businesses – equity balance sheet; Income and expenses-financial result; Cash flow statement.*

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[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)

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

[7] Optional – enter W, obligatory – enter Ob

27. *Principles of ledger accounts. The chart of accounts.*
28. *Evaluation of significance in statistical testing.*
29. *A measure of the goodness of econometric models.*
30. *In terms of financial analysis "-an analysis of liquidity, profitability, structure -zone.*
31. *Methods for assessing the effectiveness of investment activity.*
32. *The essence of innovation and management innovation.*
33. *Marketing-mix as a concept on the market impact through product, price, distribution and promotion.*
34. *The realization of personal function design teams.*
35. *Control techniques of occupational groups.*
36. *Initiating and defining projects. Assessment of the feasibility of the projects. Risk analysis projects. Determination of the structure of the projects.*

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)
		Mathematical Analysis I	2
		Legal and economic environment of enterprises	2
		Mathematical Analysis II	3
		Engineering drawing, graphics	3
		Introduction to programming	4
		Learn about the enterprise	4
		Discrete mathematics for engineers	5
		System identification	5

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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)

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[7] Optional – enter W, obligatory – enter Ob

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

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