## PROGRAMME OF STUDIES

# 1. Description

Number of semesters: 3	Number ECTS points necessary to obtain qualifications: 90
Prerequisites (particularly for second-level studies): ENROLMENT: requirements defined every year by the Senate and Faculty Council	Upon completion of studies graduate obtains professional degree of: MAGISTER INŻYNIER 2nd level qualifications
Possibility of continuing studies:	Graduate profile, employability:
Studies of the III level (PhD)	The graduate will have gained knowledge in computer science and experiences in designing practical applications, especially for industrial and control systems. They will be prepared for solving problems in informatics, control sciences, and technology (especially designing computer systems for industry using classical and intelligent solutions) and gaining information from the literature and other sources. They will be able to play the role of the leader of a team and to organize and to run research debates. They will have acquired the experience necessary for a professional career with research units, industry and at universities and colleges. They will have gained substantial international experience and have been acquainted with the circumstances and the environment of prestigious laboratories. They will possess well above standard skills in English communication.
Indicate connection with University's mission and its development strategy:	

Program of study is consistent with the Faculty of Electronics Development Plan approved by the Faculty Council on 22.02.2012.

Faculty Development Plan is completely correlated with the University mission and development strategy, approved by the Senate of the Wroclaw University of Technology in 2011.

#### 2. Fields of science and scientific disciplines to which educational effects apply:

Field of science: Technical Sciences Scientific discipline: Computer Science

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

Constitution of AIC specialization was preceded by long-term research and didactic cooperation between Coventry University and Wroclaw University of Technology. Several students have been practicing parts of their studies in the United Kingdom (UK) (usually simultaneously working on grants for UK based industry), obtaining the diploma, gaining practical experience and continuing their education on doctoral studies. Lecturers from the UK were taking part in didactic processes in Poland, giving courses on master and doctoral levels. Common experiences and recognition of industry requirements allowed the creation of a specialist programme, developed in cooperation by Polish and UK parties. Education obtained from AIC specialization ensures familiarity with use of the English Language and with UK technical and scientific terminology which will help guarantee that graduates will be preferred on the job market, especially in international corporations. The programme meets specific market requirements in common fields of computer science, automatics and control, for example in the automotive industry, where skills on conducting simulation research and designing effective control systems is a valuable skill. The programme of specialization is also oriented towards gaining skills in scientific research both as an individual and as a member of a team, consequently it also addresses the demands of universities seeking talented and creative candidates for doctoral studies and research positions.

<sup>&</sup>lt;sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

<sup>&</sup>lt;sup>2</sup>Traditional – enter T, remote – enter Z

<sup>&</sup>lt;sup>3</sup>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)

<sup>&</sup>lt;sup>4</sup>University-wide course /group of courses – enter O

<sup>&</sup>lt;sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

<sup>&</sup>lt;sup>6</sup> KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

<sup>&</sup>lt;sup>7</sup> 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. 1 ECTS points):

N	Ю	Course/group	Name of course/group of courses	We	ekly	numb	er of	hours	Field-of-	Numbe	r of hours	Numb	per of ECTS points	Form <sup>2</sup> of	Way3 of	Course/gr	oup of cou	rses	
		of courses code	(denote group of courses with symbol <b>GK</b> )			pr	sem	study educational effect symbol	ZZU	CNPS	total	BK classes <sup>1</sup>	course/group of courses	crediting	university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>	
	1	FLEA002W	Social Communication	1					K2INF_W03 K2INF_K02	15 1	30	1	0,5	Т	Z	0		КО	Ob
			Total	1	0	0	0	0	-	15	30	1	0,5	-	_	_	P(0)	_	_

#### Altogether for general education modules

	To	otal number o	of hours		Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	
lec	cl	lab	pr	sem				
1	0	0	0	0	15	30	1	0,5

#### 4.1.2 List of basic sciences modules

#### 4.1.2.1 Mathematics module

N	lo	Course/group	Name of course/group of courses (denote	Week	cly n	umbe	er of	hours	Field-of-	Number	of hours	Numbe	er of ECTS points	Form <sup>2</sup> of	Way3 of	Course/gro	oup of cou	rses	
		of courses	group of courses with symbol <b>GK</b> )	lec	cl	lab	pr	sem	study educational		CNPS	total	BK classes <sup>1</sup>	course/group	crediting	university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
		code							effect					of courses					
									symbol										

<sup>&</sup>lt;sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

<sup>&</sup>lt;sup>2</sup>Traditional – enter T, remote – enter Z

<sup>&</sup>lt;sup>3</sup>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)

<sup>&</sup>lt;sup>4</sup>University-wide course /group of courses – enter O

<sup>&</sup>lt;sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

<sup>&</sup>lt;sup>6</sup> KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

<sup>&</sup>lt;sup>7</sup> Optional – enter W, obligatory – enter Ob

1	IINEA202W	Optimization Methods: Theory and Applications ( <b>GK</b> )	2					K2INF_W01 S2AIC_W02	30	45	4	1	Т	E (w)			S	Ob
2	IINEA2021. I	Optimization Methods: Theory and Applications ( <b>GK</b> )			1			S2AIC_U05	15	15		0,5	Т	Z		P (2)	S	Ob
3	IINEA202P	Optimization Methods: Theory and Applications ( <b>GK</b> )				1		S2AIC_U14	15	60		1	Т	Z		P (2)	S	Ob
		Total	2	0	1	1	0	-	60	120	4	2,5	-	_	-	P (4)	_	_

#### 4.1.2.2 Physics module

N	Course/group	Name of course/group of courses	We	ekly	numb	er of	hours	Field-of-	Numbe	r of hours	Numl	per of ECTS points	Form <sup>2</sup> of	Way3 of	Course/gr	oup of cou	rses	
	of courses code	(denote group of courses with symbol <b>GK</b> )	lec	cl	lab	pr		study educational effect symbol	ZZU	CNPS	total	BK classes <sup>1</sup>	course/group of courses	crediting	university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
	FZEA001W	Physics	1					K2INF_W02	15	30	1	0,5	T	Z	0		PD	Ob
		Total	1	0	0	0	0	_	15	30	1	0,5	_	_	_	P (0)	_	_

#### Altogether for basic sciences modules:

	To	otal number o	of hours		Total	Total	Total	Number of
					ZZU		number of ECTS points	ECTS points for BK classes <sup>1</sup>
					hours			
lec	cl	lab	pr	sem				
3	0	1	1	0	75	150	5	3

## 4.1.3 List of main-field-of-study modules

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

<sup>&</sup>lt;sup>3</sup>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)

<sup>&</sup>lt;sup>4</sup>University-wide course /group of courses – enter O

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

<sup>&</sup>lt;sup>7</sup> Optional – enter W, obligatory – enter Ob

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 <b>GK</b> )	W	eek	ly nu hou		er of	Field-of-study educational		nber of ours	Nur	nber of ECTS points	Form <sup>2</sup> of course/group		Course/g	roup of co	ourses	j
	code		lec	cl	lab	pr	sem	effect symbol	ZZU	CNPS	total	BK classes <sup>1</sup>	of courses		university- wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type
1	INEA207W	System Analysis and Computer Project Management ( <b>GK</b> )	1					K2INF_W08 S2AIC_W01	15	30	5	0,5	Т	E (w)			K	Ob
2	INEA207L	System Analysis and Computer Project Management ( <b>GK</b> )			1			K2INF_U02 K2INF_K04 S2AIC_U01	15	30		2	Т	Z		P (1)	K	Ob
3	INEA207P	System Analysis and Computer Project Management ( <b>GK</b> )				1		K2INF_U03 K2INF_U04 S2AIC_U02 K2INF_K04	15	60		1	Т	Z		P(1)	K	Ob
4	INEA207S	System Analysis and Computer Project Management ( <b>GK</b> )					1	K2INF_W08 S2AIC_W01 S2AIC_U01, S2AIC_U02, K2INF_U02, K2INF_U03, K2INF_U04, K2INF_K04	15	30		0,5	Т	Z			K	Ob
5	INEA106W	IT Applications: Electronic Media in Business and Commerce ( <b>GK</b> )	2					K2INF_W05 K2INF_W06 K2INF_K03	30	60	5	1	Т	E (w)			K	Ob
6	INEA106P	IT Applications: Electronic Media in Business and Commerce ( <b>GK</b> )				2		K2INF_U01 K2INF_K03	30	90		1	Т	Z		P (3)	K	Ob
	_	Total	3	0	1	3	1	_	120	300	10	6	_	_	_	P (5)	_	_

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

<sup>&</sup>lt;sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students
<sup>2</sup>Traditional − enter T, remote − enter Z

<sup>3</sup>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)

<sup>4</sup>University-wide course / group of courses − enter O

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

<sup>6</sup> KO − general education, PD − basic sciences, K − field-of-studies, S − specialization

<sup>7</sup> Optional − enter W, obligatory − enter Ob

	To	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 <sup>1</sup>
lec	cl	lab	pr	sem				
3	0	1	3	1	120	300	10	6

# **4.2 List of optional modules**

## 4.2.1 List of general education modules

**4.2.1.1** *Foreign languages* module (min. 3 ECTS points):

No	Course/group	Name of course/group of courses	We	ekly	numb	er of	hours	Field-of-	Numbe	r of hours	Numb	per of ECTS points	Form <sup>2</sup> of	Way <sup>3</sup> of	Course/gr	oup of cou	rses	
	of courses code	(denote group of courses with symbol <b>GK</b> )	lec	cl	lab	pr		study educational effect symbol	ZZU	CNPS	total	BK classes <sup>1</sup>	course/group of courses	crediting	university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1		English B2+		1				K2INF_U06	15	30	1	0,5	T	Z	О	P(1)	KO	W
2		Foreign/Polish Language		3				K2INF_U07	45	60	2	1,5	T	Z	0	P(2)	KO	W
		Total	0	4	0	0	0	_	60	90	3	2	_	-	_	P (3)	_	_

#### Altogether for general education modules:

<sup>&</sup>lt;sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

<sup>&</sup>lt;sup>2</sup>Traditional – enter T, remote – enter Z

<sup>&</sup>lt;sup>3</sup>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)

<sup>&</sup>lt;sup>4</sup>University-wide course /group of courses – enter O

<sup>&</sup>lt;sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

<sup>&</sup>lt;sup>6</sup> KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

<sup>&</sup>lt;sup>7</sup> Optional – enter W, obligatory – enter Ob

	To	otal number o	of hours		Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	1
lec	cl	lab	pr	sem				
0	4	0	0	0	60	90	3	2

## **4.2.2** List of specialization modules

**4.2.2.1** Specialization subjects – Advanced Informatics and Control modules (min. 45 ECTS points):

No	Course/group of courses	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	We		ly num hours	ber of	Field-of- study		nber of ours	Nun	nber of ECTS points	Form <sup>2</sup> of course/group	Way <sup>3</sup> of crediting	Course/g	roup of co	ourses	
	code	•	lec	cl	lab p	or se	educational effect symbol	ZZU	CNPS	total	BK classes <sup>1</sup>	of courses		university- wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	INEA203W	Signals and Telecommunication (GK)	1				K2INF_W07 S2AIC_W06	1 12	45	3	1	Т	Z			S	Ob
2	INEA203L	Signals and Telecommunication (GK)			1		S2AIC_U12	15	45		1	T	Z		P (2)	S	Ob
3	INEA220W	Advanced Algorithms in Combinatorial Optimization (GK)	1				K2INF_W07 S2AIC_W07	1 12	45	3	1	T	Z			S	Ob
4	INEA220L	Advanced Algorithms in Combinatorial Optimization (GK)			1		S2AIC_U07 S2AIC_U13	1 15	45		1	Т	Z		P (2)	s	Ob
5	INEA221W	Modeling and Identification (GK)	1				K2INF_W07 S2AIC_W05	1 12	30	3	1	T	Z			S	Ob
6	INEA221L	Modeling and Identification (GK)			1		S2AIC_U10 S2AIC_U11	15	60		1	T	Z		P (2)	S	Ob
7	INEA222W	Computer Control Systems (GK)	1				K2INF_W07 S2AIC_W04	1 12	30	3	1	T	Z			S	Ob
8	INEA222L	Computer Control Systems (GK)			1		S2AIC_U08 S2AIC_U09	1.15	60		1	T	Z		P (2)	S	Ob
9	INEA223W	Methods of Computational Intelligence and Decision Making (GK)	1				S2AIC_W03	15	30	4	0,5	T	E (w)			S	Ob

<sup>&</sup>lt;sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

<sup>&</sup>lt;sup>2</sup>Traditional – enter T, remote – enter Z

<sup>&</sup>lt;sup>3</sup>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)

<sup>&</sup>lt;sup>4</sup>University-wide course /group of courses – enter O

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

<sup>&</sup>lt;sup>7</sup> Optional – enter W, obligatory – enter Ob

10	INEA223L	Methods of Computational Intelligence and Decision Making (GK)			1			S2AIC_K01	15	30		1	T	Z		P(1)	S	Ob
11	INEA223P	Methods of Computational Intelligence and Decision Making (GK)				1		S2AIC_K01	15	45		1,5	T	Z		P (1,5)	S	Ob
12	INEA223S	Methods of Computational Intelligence and Decision Making (GK)					1	S2AIC_U04	15	15		0,5	T	Z			S	Ob
13	INEA206P	Research Skills and Methodologies 1 ( <b>GK</b> )				4		S2AIC_U03 S2AIC_K01 S2AIC_K02	60	100	5	2	Т	Z		P (4)	S	Ob
14	INEA206S	Research Skills and Methodologies 1 ( <b>GK</b> )					2	S2AIC_U04 S2AIC_K01 S2AIC_K02	30	50		1	Т	Z		P (1)	S	Ob
15	INEA209W	Modeling and Optimization of Computer Networks (GK)	2					S2AIC_W08	30	45	5	1,5	Т	E (w)			S	Ob
16	INEA209P	Modeling and Optimization of Computer Networks (GK)				1		S2AIC_U15	15	60		1	Т	Z		P (1,5)	s	Ob
17	INEA209S	Modeling and Optimization of Computer Networks (GK)					1	S2AIC_U16	15	45		1	Т	Z		P(1)	S	Ob
18	INEA210W	Introduction to Computer Vision in Quality Control (GK)	2					S2AIC_W09	30	70	5	2	Т	Z			S	Ob
19	INEA210P	Introduction to Computer Vision in Quality Control (GK)				2		S2AIC_U17	30	80		2	Т	Z		P (2)	S	Ob
20	INEA208P	Research Skills and Methodologies 2				4		S2AIC_U20	60	150	5	3	Т	Z		P (5)	S	Ob
21	INEA224S	Advanced Informatics and Control Seminar 1					2	K2INF_W04 K2INF_W09		60	2	1	Т	Z		P (2)	S	Ob
22	INEA226P	Research Skills and Methodologies 3 (GK)				1		S2AIC_U06	15	75	5	2	Т	Z		P (3)	S	Ob
23	INEA226S	Research Skills and Methodologies 3 ( <b>GK</b> )					1	S2AIC_U07 S2AIC_U21 S2AIC_K03	15	75		1	Т	Z		P (2)	S	Ob
24	INEA225S	Advanced Informatics and Control Seminar 2					2	K2INF_W09 K2INF_U05		150	5	2	Т	Z		P (4)	s	Ob
		Total	9	0	5	13	9	_	540	1440	48	31	_	-	_	P (36)	_	-

#### **4.2.2.2** Group A of elective modules (min. 3 ECTS points):

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

<sup>&</sup>lt;sup>3</sup>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) <sup>4</sup>University-wide course /group of courses – enter O

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

No	Course/group of courses	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	W	eek	ly nu hou		er of	Field-of-study educational		nber of ours	Nur	nber of ECTS points	Form <sup>2</sup> of course/group	Way <sup>3</sup> of crediting	Course/gr	oup of co	ourses	
	code	g	lec	cl	lab	pr	sem	effect symbol	ZZU	CNPS	total	BK classes <sup>1</sup>	of courses		university- wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	INEA211W	Object-oriented Parallel Programming Techniques $(GK)$	2					S2AIC_W10	30	30	3	1	Т	Z			S	W
2	INEA2111.	Object-oriented Parallel Programming Techniques $(GK)$			2			S2AIC_U18	30	60		1	Т	Z		P (2)	S	W
3	INEA212W	Modern Hardware and Software Management Platform ( <b>GK</b> )	2					S2AIC_W10	30	30	3	1	Т	Z			S	W
4	INEA212L	Modern Hardware and Software Management Platform ( <b>GK</b> )			2			S2AIC_U18	30	60		1	Т	Z		P (2)	S	W
5	INEA213W	Information Storage and Management (GK)	2					S2AIC_W10	30	30	3	1	T	Z			S	W
6	INEA213L	Information Storage and Management (GK)			2			S2AIC_U18	30	60		1	T	Z		P(2)	S	W
		Total	2	0	2	0	0	_	60	90	3	2	_	_	-	P (2)	-	-

#### **4.2.2.3** *Group B of elective modules* (min. 5 ECTS points):

No	Course/group of courses	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	W	'eek	ly nu hou		er of	Field-of-study educational		nber of ours	Nur	nber of ECTS points	Form <sup>2</sup> of course/group	Way <sup>3</sup> of crediting		oup of co	ourses	
	code	group or comises man symbol (22)	lec	cl	lab	pr	sem	effect symbol	ZZU	CNPS	total	BK classes <sup>1</sup>	of courses		university- wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	INEA214W	Manufacturing Control Systems (GK)	2					S2AIC_W11	30	60	5	1	T	Z			S	W
2	INEA214L	Manufacturing Control Systems (GK)			1			S2AIC_U19	15	45		2	T	Z		P(1)	S	W
3	INEA214P	Manufacturing Control Systems (GK)				1		S2AIC_U19	15	45		1	T	Z		P (2)	S	W
4	INEA215W	Teleinformatics Satellite Systems (GK)	2					S2AIC_W11	30	90	5	1	T	Z			S	W
5	INEA215L	Teleinformatics Satellite Systems (GK)			1			S2AIC_U19	15	30		2	T	Z		P (2)	S	W
6	INEA215S	Teleinformatics Satellite Systems (GK)					1	S2AIC_U19	15	30		1	T	Z		P(1)	S	W
7	INEA219W	Adaptive Control and Industrial Control Systems (GK)	2					S2AIC_W11	30	60	5	1	T	Z			S	w
8	INEA219L	Adaptive Control and Industrial Control Systems			1			S2AIC_U19	15	30		2	T	Z		P(1)	S	W

<sup>&</sup>lt;sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students
<sup>2</sup>Traditional − enter T, remote − enter Z

<sup>3</sup>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)

<sup>4</sup>University-wide course / group of courses − enter O

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

<sup>6</sup> KO − general education, PD − basic sciences, K − field-of-studies, S − specialization

<sup>7</sup> Optional − enter W, obligatory − enter Ob

		(GK)																
9	IINEA219P	Adaptive Control and Industrial Control Systems (GK)				1		S2AIC_U19	15	60		1	T	Z		P (2)	S	W
	Total		2	0	1	1	0	_	60	150	5	4	-	_	_	P (3)	-	_

Altogether for specialization modules:

			0					
	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 <sup>1</sup>
lec	cl	lab	pr	sem				
13	0	8	14	9	660	1680	56	37

#### 4.3 Diploma dissertation module

Type of diploma dissertation	magister				
Number of diploma dissertation semesters	Number of ECTS points	Code			
1	15 P(10)	INEA227			
Character of diploma dissertation					
scientific research					
Number of BK <sup>1</sup> ECTS points	7				

#### 5. Ways of verifying assumed educational effects

Type of classes	Ways of verifying assumed educational effects
lecture	written or oral crediting, colloquium (test), written exam, colloquium, oral exam
class	control reports average grade, homework assignments average grade, classwork grades, final test

<sup>&</sup>lt;sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students <sup>2</sup>Traditional – enter T, remote – enter Z

<sup>&</sup>lt;sup>3</sup>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)

<sup>&</sup>lt;sup>4</sup>University-wide course /group of courses – enter O

<sup>&</sup>lt;sup>6</sup> KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
Optional – enter W, obligatory – enter Ob

laboratory	monitoring the preparation for and realization of laboratory exercises, evaluation of laboratory tasks, presentation of results with conclusions and discussion, pretest, report from laboratory
project	realization analysis of project assignment, written project documentation, presentation of project assumptions and final solution, presentation of project results with conclusions and discussion, evaluation of report, evaluation of project realization, project defense, participation in problem discussions, evaluations of project elements and final project, evaluation of simulation software, oral answers, discussions, presentation of initial results for diploma dissertation.
seminar	topic presentation, participation in discussion, report on seminar realization, evaluation of technical aspects and merits of the presentation
diploma dissertation	prepared diploma dissertation

**6. Total number of ECTS points, which student has to obtain from classes requiring direct academic teacher-student contact (enter total** of ECTS points for courses/groups of courses denoted with code BK<sup>1</sup>) 55,5 ECTS

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

Number of ECTS points for obligatory subjects	5
Number of ECTS points for optional subjects	0
Total number of ECTS points	5

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

Number of ECTS points for obligatory subjects	9
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<sup>&</sup>lt;sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

<sup>&</sup>lt;sup>2</sup>Traditional – enter T, remote – enter Z

<sup>&</sup>lt;sup>3</sup>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)

<sup>&</sup>lt;sup>4</sup>University-wide course /group of courses – enter O

<sup>&</sup>lt;sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

<sup>&</sup>lt;sup>6</sup> KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

<sup>&</sup>lt;sup>7</sup> Optional – enter W, obligatory – enter Ob

Number of ECTS points for optional subjects	54
Total number of ECTS points	63

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 O)

5 ECTS points

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

59 ECTS points

11. Range of diploma dissertation (attachment no. 1)

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

No.	Course code	Name of course	Crediting by deadline of (number of semester)
1		Foreign / Polish Language	2
2		English B2+	2

#### 13. Plan of studies (attachment no. 2)

Approved by faculty student government legislative body:

<sup>&</sup>lt;sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

<sup>&</sup>lt;sup>2</sup>Traditional – enter T. remote – enter Z

<sup>&</sup>lt;sup>3</sup>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)

<sup>&</sup>lt;sup>4</sup>University-wide course /group of courses – enter O

<sup>&</sup>lt;sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

<sup>&</sup>lt;sup>6</sup> KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

<sup>&</sup>lt;sup>7</sup> Optional – enter W, obligatory – enter Ob

Date, name and surname, signature of student representative
Date, Dean's signature

<sup>&</sup>lt;sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students
<sup>2</sup>Traditional − enter T, remote − enter Z

<sup>3</sup>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)

<sup>4</sup>University-wide course /group of courses − enter O

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

<sup>6</sup> KO − general education, PD − basic sciences, K − field-of-studies, S − specialization

<sup>7</sup> Optional − enter W, obligatory − enter Ob