Zał. nr 2 do ZW 64/2012

Attachment no. …. to Programme of Education

PROGRAMME OF STUDIES

1. Description

Number of semesters: 4	*Number ECTS points necessary to obtain qualifications: 120*
Prerequisites (particularly for the second-level studies): *Competition of the first level study diplomas.* *Required: Bachelor Degree, preferably in computer science or in a related area. Applicants with a bachelor degree outside of computer science must demonstrate significant proficiency in computer science. Any area of requirements can be satisfied through courses completed at the bachelor level or by suitable experience.* *Each application is assessed individually on its merits.*	*Upon completion of studies graduate obtains* *professional degree of: magister (MSc)* *~~1st~~/2nd* level qualifications*
Possibility of continuing studies: *the possibility to continue study at the PhD level*	*Graduate profile, employability:* *At the second level of study. students can choose one of 12 specialisation offered by Faculty of Computer Science and Management: security of information systems, informatics technologies of knowledge management, intelligent information systems, Internet and mobile technologies, software engineering, information systems, database systems, decision support systems, teleinformatics, intelligent information systems, computer engineering, information technologies. It is a general Faculty offer. In each admission process different specializations may be open,*

	which one will be open depends on students preference. Moreover some specializations are given in English. *The result of education is the knowledge, skills and social competence, which are included in annex No. 1 to the Education Program.* *Extended knowledge in the field of specialization* *Gained skills:* *• is able to solve complex computing tasks using advanced informatics techniques in the field of studied specialization: security and reliability of information systems, intelligent information systems, Internet and mobile technology, software engineering, systems design, database systems, information systems, decision support systems, teleinformatic* *• is able to create models, analyze them and takes decision for different types of objects* *• acquires information from literature, databases and other sources, also in English, integrates obtained information, interprets it, critically evaluates, conclusions and formulates justifies opinions* *• communicates using a variety of techniques, also in English, prepares a elaboration in Polish language and short scientific report in English on the results of their own research. In the case of foreign students can prepare a short reserch report in Polish, but*

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

	the full report in English *• defines the directions of further learning and implements the process of self-learning* *A graduate can be employed in IT companies as well as in companies and organizations that uses tools and information systems as managers or specialist. They can work as: System Analyst, Programmer Analyst, System Consultant, designer of information systems, manager, system architect , etc.*
Indicate connection with University's mission and its development strategy:	*Informatics field of study is carried out at the Faculty of Computer Science and Management, which is one of the largest of 12 faculties of Wrocław University of Technology. Teaching program at Informatics field of studies is carried out at 12 specializations (9 in Polish language, 3 in English language) that reflect the current needs of the region, and the place and role of the Wrocław University of Technology as a leading university and research centre in the region. Differentiation of substantive specialization is justified by the dynamically changing of market needs, and by the academics staff having achievements at the highest level in the discipline of computer science. Development of specialties takes place in the framework of international agreements and international research and teaching programs (eg. an international agreement with universities in Vietnam contributed to the creation of Intelligent Information Systems specialization).Moreover,*

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	development of Informatics field of study is realized by participating of Institute of Informatics in different international research and educational programs, in which students take part. They can carrying out research as well as diploma theses. Teaching at a high level must be based on adequate laboratory facilities in which students can develop their skills. The Institute has the necessary computing equipment, laboratories and software to conduct teaching at the second study level, but in accordance to the mission of the university - is currently under construction the project of a new building (investment shared with the Faculty of Mechanical Engineering and the Faculty of Chemistry), in which will be built complex of 16 specialized teaching laboratories for students of the second and third degree level of study in Computer Science. *These are the following laboratories: Safety and Reliability of Information Systems Laboratory, Intelligent Multimedia Data Mining Systems Laboratory, Modeling and Analysis of Web-based Systems Laboratory, Software Engineering Laboratory, Information System Design and Knowledge Management Laboratory, Advanced Database Systems Laboratory, Multimedia Laboratory, Intelligent multi-agent systems and sensors networks Laboratory, Wired and Wireless Computer Networks and Engineering of Teleinformatic Traffic Laboratory, System Recognition and Data Exploration Laboratory, Internet Testing*

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	and Measurement Laboratory, Multimedia and Mobile Technologies Laboratory, Laboratory and Scaled Hybrid Processing Technology, Internet of Things, Web of Things Technologies Laboratory, Intelligent Measurement Systems Smart Grid Laboratory, Application of Modelling, Identification and Optimization in Medicine and Sport Laboratory. *According to the mission of the University for needs in terms of relations with region and its economy, the Institute has strong relations with local as well foreign IT companies. Cooperation with companies includes the following forms: ordering projects by IT companies, ordering projects by IT companies, ordering reviews for innovation, special lectures for students conducted by experts from companies, realization by students diploma thesis on topics in which company is interested in, practical training for students, sponsoring of student competitions organized by the Institute of Informatics, joint seminars of business professionals and employees of the Faculty of Computer Science and Management organized by the IT Companies Forum, hardware and software support by IT companies for academic initiatives. The most important companies which cooperates with the Institute of Informatics are as follows: Capgemini, IBM, Microsoft Corp., Nokia Siemens Networks, Volvo, InsERT.*

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

Informatics direction is general academic profile that belongs to education area of technical sciences

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

Correspond to the needs of:

a) institutions and companies engaged in an activity of manufacturing, trade, services and research for IT professionals involved in the maintenance / development of IT tools to support this activity at the operational and strategic (planning, management) levels,
b) manufacturers of computerized systems for management, decision-making and control on position at sales and software production departments
c) consulting companies for position of integrators, systems analysts, software developers, consultants, computer system designers, project managers, architects, etc.
d) companies designing IT systems for application related with the specialization

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4. List of education modules:
4.1. List of obligatory modules:
4.1.1 List of general education modules

4.1.1.1 **Moduł** Przedmioty z obszaru nauk humanistycznych

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	INZ0166S	Ethics of new technologies					1	K2INF_W07 **K2INF_K03** K2INF_K05	15	60	2	1,2					KO	Ob.
		Total					1		15	60	2	1,2						

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	INZ0108Wls	System Modelling and Analysis **(GK)**	2	1	0	0	1	K2INF _W01 K2INF _W05 K2INF _U05	60	180	6	3,6	T	E		(2)	PD	Ob.
		Total	2	1	0	0	1		60	180	6	3,6						

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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

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				
2	1	0	0	1	60	180	6	3,6

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 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	INZ0109Wps	Advanced databases **(GK)**	1	0	0	2	1	K2INF _W05, K2INF _U05	60	210	7	4,2	T	Z		(3)	K	Ob.
2	INZ0113Wc	Information System Modelling and Analysis **(GK)**	2	2	0	0	0	K2INF _W04	60	210	7	4,2	T	E			K	Ob.
3	INZ0138Wp	Software System Development **(GK)**	2	0	0	2	0	K2INF _W04 **K2INF_U07**	60	180	6	3,6	T	Z		(3)	K	Ob.
4	INZ0139Wc	Foundation of Knowledge Engineering **(GK)**	2	2	0	0	0	K2INF _W02, K2INF _U05 K2INF _U05	60	180	6	3,6	T	E		(3)	K	Ob.
5	INZ0151W	Research Methodology	2	0	0	0	0	K2INF _W05	30	90	3	1,8	T	Z			K	Ob.
6	INZ0152Wc	Business modeling and analysis **(GK)**	1	1	0	0	0	K2INF _W03, K2INF _U06	30	90	3	1,8	T	Z			K	Ob.
		Total	10	5	0	4	1		300	980	32	19,2						

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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
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

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

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				
37	10	25	3	0	1125	2760	92	55,2

4.1.4. List of specialization modules

4.1.4.1 *Obligatory specialization* modules

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	INZ0110Wp	Advanced Topics in Artificial Intelligence **(GK)**	2	0	0	2	0	K2INF_W06, K2INF_U08	60	210	7	4,2	T	E		(3)	S	Ob.
2	INZ0135Wl	Modelling and Analysis of Web-based Systems **(GK)**	2	0	2	0	0	K2INF_W06, **K2INF_U07** K2INF_U08	60	180	6	3,6	T	E		(3)	S	Ob.
3	INZ0136Wcl	Parallel and Distributed Computing **(GK)**	2	1	1	0	0	K2INF_W06, **K2INF_U07** K2INF_U08	60	180	6	3,6	T	E		(2)	S	Ob.
4	INZ0137Wl	Mobile and Multimedia Systems **(GK)**	1	0	3	0	0	K2INF_W06, **K2INF_U07** K2INF_U08	60	180	6	3,6	T	Z		(4)	S	Ob.
5	INZ0140Ws	Application and Challenges of Computer Science **(GK)**	2	0	0	0	2	K2INF_W06, K2INF_U08	60	150	5	3,0	T	Z			S	Ob.
6	INZ0141s	Preparatory Seminar	0	0	0	0	2	K2INF_U01, K2INF_U02	30	60	2	1,2	T	Z			S	Ob.
		Total	9	1	6	2	4		330	960	32	19,2						

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

Altogether (for o*bligatory specialization* modules):

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes[1]
lec	cl	lab	pr	sem				
9	1	6	2	4		330	960	32

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 *(min5 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	JZL100400BK	Foreign language I	0	3	0	0	0	K2INF _U04	45	60	2	1,2	T	Z	O		KO	W
2	JZL100400BK	Foreign language II	0	1	0	0	0	K2INF _U04	15	30	1	0.6	T	Z	O		KO	W.
		Total		4					60	90	3	1,8						

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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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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]
		Total																

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]
		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				60	90	3	1,8

4.2.2 List of basic sciences modules

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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]
		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				

[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

4.2.3 List of main-field-of-study modules

4.2.3.1 Module M_3.1 *(min 7 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	INZ0143Wcs	Parallel Computer Architecture **(GK)**	2	1			1	K2INF_W06, K2INF_U08	60	210	7	4,2	T	E			S	W.
2	INZ0122Wl	Advanced Computer Network **(GK)**	2	0	2	0	0	K2INF_W06, K2INF_U08	60	210	7	4,2	T	E		(3)	S	W
		Total	2	1	1	0	0		60	210	7	4,2						

4.2.3.2 Module M_3.2 *(min. 7 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	INZ0145Wl	Advanced Computer Graphic **(GK)**	2	0	2	0	0	K2INF_W06, K2INF_U08	60	210	7	4,2	T	E		(3)	S	W.
2	INZ0146Wl	Digital Image Processing **(GK)**	2	0	2	0	0	K2INF_W06, K2INF_U08	60	210	7	4,2	T	E		(3)	S	W
3	INZ0147Wl	Multimedia Information Systems **(GK)**	2	0	2	0	0	K2INF_W06, K2INF_U08	60	210	7	4,2	T	E		(3)	S	W
4	INZ0148Wl	User Interface Development **(GK)**	2	0	2	0	0	K2INF_W06, K2INF_U08	60	210	7	4,2	T	E		(3)	S	W
		Total	2	0	2	0	0		60	210	7	4,2						

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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

4.2.3.3 Module M_3.3 *(min.7 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	INZ0149Wlp	Data Warehouses **(GK)**	1	0	2	1	0	K2INF_W06, K2INF_U08	60	210	7	4,2	T	E		(3)	S	W.
2	INZ0150Wl	Expert Systems **(GK)**	2	0	2	0	0	K2INF_W06, K2INF_U08	60	210	7	4,2	T	E		(3)	S	W
		Total	2	0	2	0	0		60	210	7	4,2						

4.2.3.4 Elective subjects module *(min.26 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	INZ0142P	MSc Thesis I	0	0	0	2	0	K2INF_U08	30	60	2	1,2	T	Z		P	S	W
2	INZ0153Wl	Monographic Subject **(GK)**	1	0	1	0	0	K2INF_U08 K2INF_W06	30	90	3	1,8	T	Z		(1)	S	W
3	INZ0154S	Diploma Seminar	0	0	0	0	2	K2INF_U01, K2INF_U02 **K2INF_K02**	30	90	3	1,8	T	Z			S	W
4	INZ0155D	MSc Thesis II	0	0	0	12	0	K2INF_U03, K2INF_U08 **K2INF_K01**	180	540	18	10,8	T	Z		P	S	W
		Total	0	0	0	12	2		210	780	26	12,6						

Altogether for main-field-of-study modules:

[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 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				
7	1	6	14	2	450	1410	47	28,2

4.2.4 List of specialization modules

4.2.4.1 *Specialization subjects (e.g. whole specialization)* 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																

4.2.4.2 ……*(e.g. diploma profile)* module *(min. .... ECTS points):*

Altogether for specialization modules:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes[1]
lec	cl	lab	pr	sem				

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

[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

Name of training			
Number of ECTS points	**Number of ECTS points for BK classes[1]**	**Training crediting mode**	**Code**
-	-	-	-

Training duration	Training objective
-	-

4.4 Diploma dissertation module

Type of diploma dissertation	Licencjat / inżynier / magister / magister inżynier	
Number of diploma dissertation semesters	**Number of ECTS points**	**Code**
2	**2 + 18**	INZ0142 INZ0155
Character of diploma dissertation		
Project, computer program, theoretical study		
Number of BK[1] ECTS points	**12**	

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 defence

[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

seminar	e.g. participation in discussion, topic presentation, essay
training	e.g. report from training
diploma dissertation	prepared diploma dissertation

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

…72…. ECTS

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

Number of ECTS points for obligatory subjects …….	73
Number of ECTS points for optional subjects ….	47
Total number of ECTS points	120

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 …….	41
Number of ECTS points for optional subjects ….	36
Total number of ECTS points	77

[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

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)

…25…. ECTS points

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

…69…. ECTS points

11. Range of diploma dissertation

1. Postulates of research methodology.
2. Modern methods used in research methodology.
3. Modeling and meta-modeling.
4. Properties and scope of using UML.
5. Problems with models transformation and consistency.
6. Model-driven and quality-driven software development.
7. Use-cases, statecharts, sequence and activity diagrams.
8. Software life cycle, different approaches.
9. MDA approach to software development.
10. Basis of requirements engineering.
11. Patterns (architectural, design, program).
12. The effectiveness of information systems.
13. Modeling of complex operation systems.
14. The concept of decision-making system and computerized decision support system.
15. Modeling, identification, and aiding of decision making process.
16. Basic problems, methods and algorithms of discrete optimization.
17. Basic methods of "soft computing".
18. Rules for specification of the relational database model.
19. Rules for mapping class diagrams onto relational models.
20. The SQL 2003 standard.
21. Evolutionary Computation.

[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

22. Introduction to machine learning, deduction versus induction.
23. Artificial neural networks.
24. Architecture of distributed and parallel systems, methods of parallel and distributed processing.
25. Grids and clusters. Exploitation and development problems.
26. Static and dynamic interconnection networks, typical topologies, different routing strategies.
27. Automatic program parallelisation, dependencies in sequential programs, identification of parallelism,
28. Evaluations of parallel systems: performance metrics, scalability of parallel systems, Amdhal, Gustafson and other laws.
29. Rule-based knowledge representations.
30. Knowledge based systems – inference mechanisms.
31. Incompleteness, inconsistency and uncertainty of knowledge.
32. Topologies of Computer Network.
33. Internet and Web services Architecture. Web and P2P systems.
34. Measurement, estimation and prediction of communication time in the Internet.
35. The Web Server model. Access and scheduling algorithms for HTTP requests in a Web Server.
36. Differences between IPv4 and Ipv6.
37. Multimedia technologies used in information systems.
38. Processing and access to multimedia data.
39. Designing of multimedia interface of computer applications.
40. Methods, techniques and tools used for designing and construction of mobile systems.

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	INZ0108	System Modelling and Analysis **(GK)**	3

[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

2	INZ0109	Advanced databases **(GK)**	3
3	INZ0110	Advanced Topics in Artificial Intelligence **(GK)**	3
4	INZ0113	Information System Modelling and Analysis **(GK)**	3
5	INZ0135	Modelling and Analysis of Web-based Systems **(GK)**	2
6	INZ0136	Parallel and Distributed Computing **(GK)**	2
7	INZ0137	Mobile and Multimedia Systems **(GK)**	2
8	INZ0138	Software System Development **(GK)**	2
9	INZ0139	Foundation of Knowledge Engineering **(GK)**	2
10	INZ0142	MSc Thesis I	2
11	INZ0140	Application and Challenges of Computer Science **(GK)**	3
12	INZ0141	Preparatory Seminar	3
13	INZ0151	Research Methodology	4
14	INZ0152	Business modeling and analysis **(GK)**	4
15	INZ0153	Monographic Subject **(GK)**	4
16	INZ0154	Diploma Seminar	4
17	INZ0155	MSc Thesis II	4

13. Plan of studies (attachment no. 1)

[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

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
[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