

PROGRAMME OF EDUCATION

FACULTY: Geoengineering, Mining, and Geology

MAIN FIELD OF STUDY: geodesy and cartography

in area of technical sciences

EDUCATION LEVEL: 1st level, inżynier studies

FORM OF STUDIES: full-time

PROFILE: general academic

LANGUAGE OF STUDY: Polish

Content:

1. Assumed educational effects – attachment no. 1
2. Programme of studies – attachment no. 2

Faculty Council Resolution of 05.09.2012

In effect since 01.10.2012

*delete as applicable

PROGRAMME OF STUDIES

1. Description

<i>Number of semesters: 7</i>	<i>Number of ECTS points necessary to obtain qualifications: 210</i>
<i>Prerequisites (particularly for second-level studies):</i>	<i>Upon completion of studies a graduate obtains professional degree of: inżynier 1st level qualifications</i>
<i>Possibility of continuing studies: 2nd level studies</i>	<i>Graduate profile, employability: A graduate should possess basic knowledge of mathematics, natural sciences, and technical sciences and specialised knowledge of the field of geodesy and cartography and should speak foreign language at B2 level. The graduate should know state-of-the-art methods for research and modelling of the Earth's shape and physical properties, for their time changes monitoring, as well as for numerical evaluation and presentation of geodetic, remote sensing and photogrammetric survey results. The graduate should be able to specify and carry out registration of an ownership of a real estate and to obtain data for spatial information systems, grounds management, rural areas development projects, compilation and construction of economic, base, topographical, and thematic maps and geodetic servicing of investments. They should be competent enough to use their knowledge for work and everyday life, to supervise working teams performing ordered tasks, to set up and manage small firms, and to use law in the range necessary to do their job and</i>

	<p><i>to run their business. The graduate should be prepared to perform engineering tasks in the field of geodesy, cartography, and land information systems and to make use of state-of-the-art techniques of geodetic surveys, of satellite, photogrammetric, and remote sensing measurements, and also to process and use those measurements results.</i></p> <p><i>The graduate should be prepared to work in: geodetic enterprises, small firms, administration and educational system.</i></p>
<p><i>Indicate connection with University's mission and its development strategy:</i></p> <p><i>Faculty of Geoengineering, Mining, and Geology is a leading scientific and educational centre in Poland and a significant one in EU. The faculty is a regional leader in science and education in the field of geotechnology and earth sciences. The profile and quality of education are of international level and fit home and European demand.</i></p> <p><i>The faculty educates in technological fields supported by natural and economic sciences. The faculty aims its educational offer at students with aptitude for exact sciences and simultaneously interested in natural and social sciences.</i></p> <p><i>The faculty stimulates international exchange of students and scientists on a large scale. Part of the educational offer is available in English. The faculty creates ties with selected foreign universities and in reasonable cases collaborates in the process leading to granting a double diploma.</i></p>	

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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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⁷ Optional – enter W, obligatory – enter Ob

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

The field of science: technical sciences

Scientific disciplines: geodesy and cartography, mining and engineering geology

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

On successful completion of the 1st level studies a graduate will have theoretical knowledge and technical abilities necessary to realize highly specialised tasks, commonly set by innovative economy in relation to spatial information systems (SIP/GIS). The graduate will also gain the basics of managerial knowledge indispensable to operate in changing business environment being aware of objectives and limitations. The graduate will be prepared to perform tasks effectively within teams. After completing studies in the field of geodesy and cartography engineers will be prepared to work professionally on geodetic servicing of big construction and mining projects, to obtain data and create spatial information systems. The graduates can work for firms being concerned with interior decoration and landscape architecture, environment shaping, spatial planning and development, production and ready markets layout planning, documentation of structures and architectural objects, appraisal of a real property, documentation of road accidents, inspection of execution of objects, vehicles and other users of spatial information.

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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 Liberal-managerial subjects module (min. 2 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	EKG4010	Introduction to Economics	1				1	K_W21 K_U42 K_K01-07	30	60	2	2	T	E, Z			KO	Ob
Total			1				1		30	60	2	2						

4.1.1.4 Information technologies module (min. 2 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	INZ0534	Information Technologies	2					K_W09 K_K03	30	60	2	2	T	Z	O		KO	Ob
Total			2						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				
3				1	60	120	4	4

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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	GGG3051	Statistical Data Analysis	2		1			K_W05 K_U06	45	120	4	3	T	Z			K	Ob
Total			2		1				45	120	4	3						

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			45	120	4	3

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4.1.3 List of main-field-of-study modules

4.1.3.1 Obligatory main-field-of-study 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	GKG1037	Basics of Surveying and Geodesy	2		2			K_W02 K_U01 K_K01	60	150	5	3	T	E, Z			K	Ob
2	GGG1033	Engineering Graphics and Technical Drawing	1			3		K_W28 K_U31	60	120	4	3	T	Z			PD	Ob
3	GKG1031	Geomatics	2					K_W01	30	60	2	2	T	Z			K	Ob
4	ING1032	Computer Science I			2			K_U07 K_K01, 02	30	60	2	1	T	Z			PD	Ob
5	ING2041	Numerical Mapping	1		2			K_W03 K_U03	45	90	3	2	T	Z			K	Ob
6	GKG2037	Surveying I	2		2	1		K_W01, 02, 03, 04, 07, 09, 15, 22 K_U01, 03, 04, 05, 09, 10, 12, 21 K_K03-06	75	150	5	3,1	T	Z			K	Ob
7	ING2044	Computer Science II			2			K_U07 K_K04, 06	30	60	2	1	T	Z			K	Ob
8	GGG2050	Fundamentals of Mining	2					K_W11 K_K07	30	60	2	2	T	E			K	Ob
9	GEG2045	Fundamentals of Geology	2		2			K_W29, 32, 41 K_K01-07	60	120	4	3,5	T	E, Z			K	Ob
10	GKG3052	Surveying II	1		1	1		K_W01, 04, 06, 07, 09, 22 K_U01, 03, 04, 05, 08, 09, 10,	45	150	5	2,1	T	E, Z			K	Ob

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							12, 21 K_K03-06										
11	GKG3053	Adjustment Calculations I	1	2			K_W06 K_U08 K_K01, 07	45	150	5	4	T	Z			K	Ob
12	GKG3054	Engineering Surveys I	1		1		K_W08 K_U11	30	90	3	2	T	Z			K	Ob
13	GKG3055	Data Bases	1		1		K_W10 K_U13 K_K07	30	90	3	2	T	Z			K	Ob
14	GKG3048	Electronic Measuring Techniques	1		1		K_W09 K_U12	30	60	2	1,5	T	Z			K	Ob
15	GKG4054	Engineering Surveys II	1		2		K_W12 K_U14	45	150	5	4	T	Z			K	Ob
16	GKG4055	Photogrammetry and Remote Sensing	2		2		K_W13 K_U15 K_K07	60	210	7	5	T	E, Z			K	Ob
17	GKG4056	Adjustment Calculations II	1	1			K_W15 K_U17	30	120	4	4	T	E, Z			K	Ob
18	GKG4057	Geographic Information Systems I	2		2		K_W14 K_U16	60	150	5	4	T	Z			K	Ob
19	GGG4014	Occupational Safety and Health and Ergonomics	1	1	1		K_W43 K_U46 K_K04	45	120	4	3,5	T	E, Z			K	Ob
20	GKG5056	Geodesy I	1		2		K_W01 K_U27	45	120	4	3	T	Z			K	Ob
21	GKG5050	Engineering Surveys III	1			2	K_W12, 17 K_U19, 21, 26	45	150	5	4	T	E, Z			K	Ob
22	GKG5058	Geographic Information Systems II	1		2		K_W18 K_U20	45	150	5	4	T	E, Z			K	Ob
23	GKG5055	Mining Surveying	1		2		K_W19 K_U01 K_K07	45	120	4	3	T	E, Z			K	Ob
24	GEG5010	Hydrogeology	1		1		K_W30 K_U33 K_K04	30	60	2	1,5	T	Z			K	Ob

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25	GHG0115	Geotechnics	1		1			K_W31, 32 K_U34, 35, 36 K_K01, 09	30	60	2	2	T	Z			K	Ob
26	IBG000115	General Structural Engineering	1		1			K_W08, 33 K_U35, 36, 47 K_K01, 04, 06	30	60	2	1,3	T	Z			K	Ob
27	BDG5010	Civil Engineering	1			1		K_W03, 33 K_U36 K_K01, 04	30	60	2	1,4	T	Z			K	Ob
28	GKG5051	Spatial Planning and Development	1		1			K_W20 K_U22	30	60	2	1,5	T	Z			K	Ob
29	GKG5053	Environmental Protection (GK)	1		1			K_W10, 14, 21, 23 K_U02, 03, 13, 16, 20, 23, 24, 30 K_K02, 04	30	60	2	1,5	T	Z (lec)			K	Ob
30	GKG6010	Cartography I	1		2	1		K_W22 K_U24, 30	60	90	3	2	T	Z			K	Ob
31	GKG6011	Land Cadastre and Management	2		2			K_W20, 23 K_U19, 25 K_K04	60	90	3	2,5	T	Z			K	Ob
32	GKG6020	Monitoring of Deformations	1		2			K_W18 K_U20	45	90	3	2	T	Z			K	Ob
33	GKG6012	Satellite Geodesy	1		2			K_W16 K_U09, 18	45	90	3	2	T	E, Z			K	Ob
34	GGG6030	Mining Areas Protection	2			2		K_W26 K_U29 K_K07	60	90	3	2	T	E, Z			K	Ob
35	GKG6013	Geodesy II	1			2		K_W01 K_U27	45	120	4	2,5	T	E, Z			K	Ob
36	GEG6011	Tectonics and Geophysics	1			1		K_W41 K_U44 K_K07	30	60	2	1,5	T	Z			K	Ob

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37	PRG7010	Surveying and Mining Law	2				2	K)_W34 K_U37	60	150	5	4	T	Z			K	Ob
38	GKG7020	Cartography II	1		1			K)_W27 K_U30	30	150	5	4	T	E, Z			K	Ob
Total			46	4	43	14	2		1635	3990	133	98,4						

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				
46	4	43	14	2	1635	3990	133	98,4

4.2 List of optional modules

4.2.1 List of general education modules

4.2.1.1 Liberal-managerial subjects module (min. 3 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	FLG108825	Liberal-Managerial Subjects	2					K)_W37 K_K01	30	60	2	1	T	Z	O		KO	W
2	PKH1772	Liberal-Managerial Subjects	1					K)_W37	15	30	1	0,5	T	Z	O		KO	W
Total			3						45	90	3	1,5						

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

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4.2.1.2 Foreign languages module (min. 5 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	JZL000000BK	Foreign Language		4				K_U01	60	60	2	2	T	Z	O		KO	W
2	JZL000000BK	Foreign Language		4				K_U01	60	90	3	3	T	Z	O		KO	W
Total				8					120	150	5	5						

4.2.1.3 Sporting classes module (min. 1 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	WFW000000BK	Physical Education		2				K_W40	30	30	1	1	T	Z	O		KO	W
Total				2					30	30	1	1						

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				
3	10				195	270	9	7,5

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4.2.2 List of basic sciences modules

4.2.2.1 Mathematics module (min. 20 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	MAP1140	Algebra and Analytical Geometry	2	1				K_W35 K_U38 K_K01	45	120	4	1,5	Z	E, Z	O		PD	W
2	MAP1142	Mathematical Analysis I	2	2				K_W36 K_U39 K_K01	60	240	8	5	T	E, Z	O		PD	W
3	MAP1144	Mathematical Analysis II	3	2				K_W36 K_U39 K_K01, 07	75	240	8	5	T	E, Z	O		PD	W
Total			7	5					180	600	20	11,5						

4.2.2.2 Physics module (min. 11 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	FZP001058	Physics I	2	2				K_W04 K_U06 K_K01-07	60	180	6	6	T	E, Z	O		PD	W
2	FZP2072	Physics II	2		1			K_W04 K_U06	45	150	5	5	T	E, Z	O		PD	W
Total			4	2	1				105	330	11	11						

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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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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				
11	7	1			285	930	31	22,5

4.2.3 List of main-field-of-study modules

4.2.3.1 Main-field-of-study courses module (min. 29 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	GKG000067	Optional Course	2					30	90	3		T	Z			K	W	
2	GKG106010	Training		30				120	180	6	3	T	Z		P	K	W	
3	GKG7021	Diploma Seminar					2	30	60	2	2	T	Z			K	W	
4	GKG000067	Optional Course	2					30	90	3		T	Z			K	W	
5	GKG7011	Diploma Dissertation		13				195	450	15	5	T	Z			K	W	
Total			4	13			2	405	870	29	10							

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				
4	13			2	405	870	29	10

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4.3 Training module (Faculty Council resolution on principles of training crediting – attachment no. 2)

Name of training		Field-of-Study Training	
Number of ECTS points	Number of ECTS points for BK classes ¹	Training crediting mode	Code
6	3	The training is crediting by the Proxy of the Dean on the basis of student's daily notes documenting realization of assumed the training programme. The final mark for the training is an arithmetic average of the mark for the quality of notes and the mark given by the plant's training tutor. The plant's tutor sends a certificate confirming realization of the training programme.	GKG106010
Training duration		Training objective	
4 weeks (20 days)		Participation in organization and accomplishment of engineering projects on quantity surveys, realization and check measurements, and projects connected with modern state-of-the-art technologies of collecting, processing and visualization of field data carried out in geodetic enterprises.	

4.4 Diploma dissertation module

Type of diploma dissertation	inżynierska	
Number of diploma dissertation semesters	Number of ECTS points	Code
1	15	GKG7011
Character of diploma dissertation		
Literature survey, project, computer program, research		
Number of BK ¹ ECTS points	5	

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

²Traditional – enter T, remote – enter Z

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

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

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

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

⁷ Optional – enter W, obligatory – enter Ob

5. Ways of verifying assumed educational effects

Type of classes	Ways of verifying assumed educational effects
lecture	examination, progress/final test
class	progress/final test
laboratory	pre-test, report on laboratory
project	project defence
seminar	participation in discussion, topic presentation, essay
training	report on training
diploma dissertation	prepared diploma dissertation

6. Total number of ECTS points, which student has to obtain from classes requiring direct academic teacher-student contact (enter total of ECTS points for courses/groups of courses denoted with code BK¹)

145,4 ECTS

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

Number of ECTS points for obligatory subjects	4
Number of ECTS points for optional subjects	31
Total number of ECTS points	35

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

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

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

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

⁷ Optional – enter W, obligatory – enter Ob

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	57
Number of ECTS points for optional subjects	1
Total number of ECTS points	58

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)

42 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 examination

1. Adjustment of geodetic networks (horizontal, altimetric, spatial)?
2. Assessment of geodetic surveys accuracy.
3. Methods for interpolation and approximation of survey results.
4. Methods of detail surveys.
5. Establishment and survey of detailed and minor geodetic control network.
6. Spherical and ellipsoidal coordinate systems.
7. Gravity potential.
8. Systems of heights (orthometric, normal)
9. Astronomical coordinate systems and their role in geodetic and satellite surveys.
10. Data Base Management Systems (DBMS), data base objects and data types.
11. Structure of SQL query put to data base.
12. Description and functions of Geographic Information Systems.

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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

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

⁷ Optional – enter W, obligatory – enter Ob

13. Spatial data models in GIS.
14. Spatial information infrastructures.
15. Measurements (determining) of engineering object displacement (deformation).
16. Geodetic servicing of investments.
17. National spatial reference system and application of map projection in Poland.
18. Data and thematic maps bases in national geodetic and cartographic resources.
19. Multi-resolution and multi-representative data bases.
20. Principles of map content compilation and editing.
21. Methods for evaluation of stereograms of aerial photographs.
22. Aerial and ground laser scanning.
23. Application of radar imagery in environmental data obtaining.
24. Legal basis and operation of the cadastre in Poland.
25. Geodetic works involved in preparation of technical documentation relating to real estate boundary delimitation and in division into lots.
26. Structure and principles of large scale maps construction and compilation.
27. Methods for testing of geodetic instruments and measuring devices in accordance with obligatory standards.

12. Plan of studies (attachment no. 1)

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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

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⁷ Optional – enter W, obligatory – enter Ob