ASIIN Accreditation Report

Bachelor's Degree Programmes / Master's Degree Programmes:

Ba Cadastre
Ba Land Management
Ba Geodesy and Cartography
Ma Geodesy
Ma Cartography
Ba / Ma Meteorology

Provided by
Al-Farabi Kazakh National University

Version: 26.09.2014

Table of Content

A About the Accreditation Process

Title of the degree Programme	Labels applied for [1]	Previous ASIIN accreditation	Involved Technical Committees (TC)[2]
Ba Cadastre	ASIIN	n/a	**03**, 11
Ba Land Management	ASIIN	n/a	**03**, 11
Ba Geodesy and Cartography	ASIIN, EUR-ACE® Label	n/a	**03**, 11
Ma Geodesy	ASIIN, EUR-ACE® Label	n/a	**03**, 11
Ma Cartography	ASIIN, EUR-ACE® Label	n/a	**03**, 11
Ba Meteorology	ASIIN	n/a	**03**, 11
Ma Meteorology	ASIIN	n/a	**03**, 11
Date of the contract: 25th of December 2012 **Submission of the final version of the self-assessment report:** 17th of February 2014 **Date of the onsite visit:** 8th -9th of July 2014 **at:** Al-Farabi Kazakh National University, Almaty, Kazakhstan			
Peer panel: Dipl.-Ing. Heinrich Brüggemann (business representative, formerly Landesvermessungsamt NRW)			

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes

[2] TC: Technical Committee for the following subject areas: TC 01 – Mechanical Engineering/Process Engineering; TC 02 – Electrical Engineering/Information Technology); TC 03 – Civil Engineering, Surveying and Architecture; TC 04 – Informatics/Computer Science); TC 05 – Physical Technologies, Materials and Processes); TC 06 – Industrial Engineering; TC 07 – Business Informatics/Information Systems; TC 08 – Agronomy, Nutritional Sciences and Landscape Architecture; TC 09 – Chemistry; TC 10 – Life Sciences; TC 11 – Geosciences; TC 12 – Mathematics; TC 13 – Physics.

Prof. Dr. Thomas Hauf (Leibniz-University Hannover) Prof. Dr. Wolfgang Huep (HFT Stuttgart) Alina Kim (student representative, East Kazakhstan State Technical University, Ust-Kamenogorsk) Prof. Dr. Wolfgang Niemeier(Technical University of Braunschweig)
Representatives of the ASIIN headquarter: Thorsten Zdebel
Responsible decision-making committee: Accreditation Commission for Degree Programmes
Criteria used: European Standards and Guidelines, version 10.05.2005 ASIIN General Criteria, version 28.06.2012 Subject-Specific Criteria of Technical Committee 03 – Civil Engineering and Geodetic Engineering as of 28.09.2012 Subject-Specific Criteria of Technical Committee 11 – Geo-Sciences in a broader sense including Geography as of 09.12.2011

In order to facilitate the legibility of this document, only masculine noun forms will be used hereinafter. Any gender-specific terms used in this document apply to both women and men.

B Characteristics of the Degree Programmes

a) Name & Final Degree	b) Areas of Specialization	c) Mode of Study	d) Duration & Credit Points	e) First time of offer & Intake rhythm	f) Number of students per intake	g) Fees (translation into € varies depending on currency rates)
B.Sc. Cadastre	Urban cadastre Cadastre of land and real estate	Full time	8 Semester 149 KZ credits = 6.696 h US credits = 248 ECTS	Sep 2010 each year in Sep	around 30	620.000 kzt per year (for foreign students or if not covered by state grant)
B.Sc. Land Management	Assessment and monitoring of land Land resources management	Full time	8 Semester 149 KZ credits = 6.696 h US credits = 248 ECTS	Apr 2010 each year in Sep	around 25	620.000 kzt per year (for foreign students or if not covered by state grant)
B.Sc. Geodesy and Cartography	Cartography Geoinformatics Applied geodesy Space geodesy and cartography	Full time	8 Semester 159 KZ credits = 7.155 h US credits = 265 ECTS	Sep 2004 each year in Sep	around 70	635.000 kzt per year (if not covered by state grant) 750.000 kzt per year for foreign students
M.Sc. Geodesy	Applied Geodesy Geoinformation Geodesy	Full time	4 Semester 59 credits (KZ/US) = 2.655 hours = 98 ECTS	Sep 2011 each year in Sep	around 7	750.000 kzt per year (if not covered by state grant) 765.000 kzt per year for foreign students
M.Sc. Cartography	Thematic of Cartography GIS mapping	Full time	4 Semester 59 credits (KZ/US) = 2.655 hours = 98 ECTS	Sep 2011 each year in Sep	around 6	750.000 kzt per year (if not covered by state grant) 765.000 kzt per year for foreign students
B.Sc. Meteorology	Meteorology and climatology Protection of atmospheric air Aviation Meteorology	Full time	8 Semester 152 KZ credits = 6.840 h US credits = 251 ECTS	Feb 2010 each year in Sep	around 64	620.000 kzt per year (if not covered by state grant) 752.000 kzt per year for foreign students
M.Sc. Meteorology	Electives for individual specialisation	Full time	4 Semester 59 credits (KZ/US) = 2.655 hours = 98 ECTS	Feb 2010 each year in Sep	around 7	750.000 kzt per year (if not covered by state grant) 800.000 kzt per year for foreign students

For the degree programme BSc Cadastre, the self-assessment report states the following **intended learning outcomes**:

Knowledge
To know
1. properties and characteristics of the land as an object of cadastral registration and evaluation;
2. normative acts on the organization of land use and protection;
3. methodology feasibility study of establishing traits of human settlements;
4. the composition of the cadastral documentation.
5. the order and procedures for the conduct of land registration, land records, their qualitative and quantitative evaluation.

Understanding
To understand
1. basic tasks, components and principles of the state land cadastre;
2. the accounting treatment of land and real property;
3. methodical issues of forming of real estate;
4. technology cadastral zoning of the urban area.

Application
To apply
1. knowledge of the principles of land resource management, real estate cadastral and land management operations;
2. knowledge about the basics of rational use of land resources, system indicators efficiency improvements use of land;
3. knowledge of the laws of the country in the part legal issues regulating land and property relations, state control over land use and real estate;
4. knowledge of methodologies of design, pre-and forward-looking materials (documents);
5. knowledge of modern technology automation of design, cadastral and other works connected with the State cadastre.

Analysis
To analyze
1. information from different sources, using the latest information technology, critically analyze received information, the main select in it;
2. recommendations on the use of research results and to present the results of research in the form of reports, papers, publications, and public discussions;
3. information about a single object property for the development of management decisions;
4. the results of the environmental and economic assessment program for schemes and projects of social and economic development of the area.

Synthesis
To synthesize
1. drafting and land management schemes and urban planning, land use planning
2. effective strategy and to form an active policy in the field of land and property relations
3. to design and constitute crop rotation schemes, plans for their development, giving them the agronomic evaluation;

Evaluation
To evaluate
1. evaluate the conditions and the consequences of organizational and management decisions in the organization and conduct of practical activities in the organization, the enterprise;
2. own advantages and disadvantages, chalk out ways and to choose the means of the strengths and deficiencies;
3. chalk out ways and choose the means of development of advantages and elimination of deficiencies;
4. ecological and economic efficiency at designing and implementation of projects.

The following **curriculum** is presented:

Title of modules	Course code	Title of courses	Credit	ECTS/ hours	Lec/ prac/ Lab	Sem.
	Semester 1					
1. State Compulsory Module	HRK 1101	History of the Republic of Kazakhstan (1991-2013)	2	3/ 90	1+1+0	1
	K(R)LPP 1102	Kazakh (Russian) language for professional purposes	3	5/135	0+2+1	1
	FLPP 1103	Foreign language for professional purposes	3	5/135	0+2+1	1
3.1 Natural Sciences (STEM) module	IT1301	Information technologies for land surveying works	***3***	5/135	1+0+2	1
	Mat1302	Mathematics	***3***	5/135	2+0+1	1
3.2. Basic Professional Modules	**Module 1 – Topography 3.2**					
	Top1401	Topography	***3***	5/135	2+0+1	1
	Semester 2					
3.1 Natural Sciences (STEM) module	CGDPM 1303	Computer graphic decoration of projects and maps	***3***	5/135	2+0+1	2
3.2. Basic Professional Modules	**Module - Economic and social geography of Kazakhstan and geodesy**					
	ESGRK 1402	Economical and social geography of the Republic of Kazakhstan	***3***	5/135	2+0+1	2
	GC 1403	Geodesy in cadastre	***3***	5/135	2+0+1	2
	Module - Cartography and basics of cadastre					
	SS 1404	Soil science	3	5/135	2+0+1	2
	Kar 1405	Cartography	3	5/135	2+0+1	2
	LC 1406	Land cadastre	3	5/135	2+1+0	2
6. Additional Types of Learning	6.1	Physical Training	8	8/360	0+0+2	1, 2, 3, 4
4. Internship		Professional internship (by type of internship):				
	TP101	Training internship	4	6/180		2
	Semester 3					
Name of modules	**Discipline code**	**Title of courses**	**Credit**	**ECTS/ hours**	**Lec /prac/ Lab.**	**Sem.**
2. Social and Communica-	PIK 2201	Psychology of interindividual communication	2	3/ 90	1+1+0	3
	TAPS 2202	Theoretical and applied political science	2	3/ 90	1+1+0	3

tive Module	EPSS 2203	Ethics of individual and social success	2	3/ 90	1+1+0	3
	CR 2204	Culture and religion	2	3/ 90	1+1+0	3
	GAS 2205	General and applied sociology	2	3/ 90	1+1+0	3
	HLS 2206	Safety of human life	2	3/ 90	1+1+0	3
	ESD 2207	Ecology and sustainable development	2	3/ 90	1+1+0	3
	FE 2208	Basics of economics	2	3/ 90	1+1+0	3
	LSK 2209	Legal system of Kazakhstan	2	3/ 90	1+1+0	3
3.2. Basic Professional Modules	**Module - Agricultural economics and basis of settlements planning**					
	AE 2407	Agricultural economics	3	5/135	2+1+0	3
	BUCPS 2408	Basics of of urban construction and planning of settlements	3	5/135	2+1+0	3
	GI 2409	Geodesic instruments	3	5/135	2+0+1	3
	Module - State registration and accounting with the bases of land melioration					
	LM 2410	Land melioration	3	5/135	2+0+1	3
	SRALRE 2411	State registration and account of land and real estate	3	5/135	2+1+0	3

Semester 4

Name of modules	**Discipline code**	**Title of courses**	**Credit**	**ECTS/ hours**	**Lec/ prac/ Lab.**	**Sem.**
1. State Compulsory Module	FNP 2104	Philosophy of scientific cognition	2	3/ 90	1+1+0	4
3.2. Basic Professional Modules	**Module - Photogrammetry**					
	Fot2412	Photogrammetry	3	5/135	1+0+2	4
	BRS2413	Basics of remote sensing	3	5/135	1+0+2	4
	BEM2414	Basics of environmental monitoring	3	5/135	2+1+0	4
3.3 Modules for Individual Educational Trajectories (Professional elective module) (IET)	IET 1 **Urban cadastre**	IET 2 **Cadastre of land and real estate**				
	SW2501 Scientific writing (kaz/rus/eng) 0+0+1	**SW2501 Scientific writing (kaz/rus/eng)** 0+0+1	1	1/45		4
	CNR2506 Cadastre of natural resources 2+1+0	CREML2506 Cadastre of real estate and monitoring of land 2+1+0	3	5/135		4
	MUT2507 Management of urban areas 2+1+0	MLRORE2507 Management of land resources and other real estate objects 2+1+0	3	5/135		4
4. Internship		Professional internship (by type of internship):				

	IP202	Industrial internship	2	3/ 90		4
	Semester 5					
3.2. Basic Professional Modules	**Module - Management of cadastral works and land use planning**					
	MCW 3415	Management of cadastral works	3	5/135	2+1+0	5
	LMLUP 3416	Land management and land use planning	3	5/135	2+0+1	5
3.3 Modules for Individual Educational Trajectories (Professional elective module) (IET)	NDLC3508 Normative documents in land cadastre 1+1+0	NDLC3508 Normative documents in land cadastre 1+1+0	2	3/ 90	5	
	TP3509 Territorial planning 2+0+1	TIREO3509 Technical inventory of real estate objects 2+0+1	3	5/135	5	
	CRA3510 Cadastre of residential areas 2+1+0	ENU3510 Economics of natural using 2+1+0	3	5/135	5	
	BUC3511 Basics of urban construction 2+1+0	SPFULR3511 Spatial planning, forecasting of using of land resources 2+1+0	3	5/135	5	
3.4 Interdisciplinary Module	**3.4** Interdisciplinary Module					
	IE 01	Innovative Entrepreneurship (trade-wise)	2	3/ 90	1+1+0	5
	IPL 02	Intellectual Property Law	2	3/ 90	1+1+0	5
	LL 03	Land law	2	3/ 90	1+1+0	5
	SLT 04	System of land taxation	2	3/ 90	1+1+0	5
	Semester 6					
3.1 Natural Sciences (STEM) module	ASPA3304	Automated systems in professional activities	***3***	5/135	2+0+1	6
3.2. Basic Professional Modules	**Module - Basics of engineering arrangement, land assessment and geodesic works in the cadastre**					
	EAT 3417	Engineering arrangement of territory	3	5/135	2+0+1	6
	LCGW 3418	Land cadastral geodesic works	3	5/135	2+0+1	6
	MLA 3419	Methods of land assessment	3	5/135	2+1+0	6
3.3 Modules for Individual Educational Trajectories (Professional elective module) (IET)	IET 1 **Urban cadastre**	IET 2 **Cadastre of land and real estate**				
	STSA3512 System of territorial state administration 2+1+0	RRET3512 Registration of real estate transactions 2+1+0	3	5/135	6	
	GUAM3513 GIS for urban areas manage-	OSCR3513 Information system	3	5/135	6	

	ment 2+0+1	of cadastre and registration 2+0+1				
4. Internship		Professional internship (by type of internship):				
	IP303	Industrial internship	2	3/ 90		6
	Semester 7					
3.2. Basic Professional Modules	**Module - Modeling in the cadastre and arrangement of the territory**					
	OMC 4420	Optimization models of cadastre	3	5/135	2+0+1	7
	PSPCS 4421	Planning, spatial planning and the cadastre of settlements	3	5/135	2+0+1	7
	Module – Economics of real estate and evaluation of land with the basics of taxation					
	ERE 4422	Economics of real estate	3	5/135	2+1+0	7
	CZATLE 4423	Cadastral zoning, assessment and taxation of land real estate	3	5/135	2+1+0	7
3.3 Modules for Individual Educational Trajectories (Professional elective module) (IET)	IET 1 **Urban cadastre**	IET 2 **Cadastre of land and real estate**				
	IWSPR4514 Inventories of work in the system of property registration 2+0+1	GDMLMC4514 GIS and digital mapping in land management and cadastre 2+0+1	3	5/135		7
	EVUL4515 Estimated value of urban land 2+1+0	PFL4515 Payments for land 2+1+0	3	5/135		7
	Semester 8					
4. Internship		Professional internship (by type of internship):				
	IP404	Industrial internship	4	6/180		8
5. Final Certification	5.1	Preparation and Presentation of Bachelor's Dissertation (Diploma Project)	2	3/ 90		8

For the degree programme BSc Land Management, the self-assessment report states the following **intended learning outcomes**:

Knowledge
To know
1. basic concepts, objectives, principles and components of land management, land monitoring, methods of preparation, processing and using information, the organizational structure of land management agencies and organizations
2. land legislation on the organization of the management and protection of land resources
3. knowledge of the laws of the country in terms of legal issues regulating land and property relations, settlement of property and land disputes, state control over land use and real estate
4. knowledge of modern technologies of video information decoding, aerial and satellite imagery, remote sensing area, the creation of original maps, plans, and other graphic materials for the land and the State Real Estate Cadaster

Understanding
To understand
1. methods of drafting and land management schemes, their feasibility;
2. ways of setting boundaries and land use of agricultural non-agricultural land within cities and other settlements;
3. design techniques of production units and business centers, engineering facilities general business purposes;
4. development of projects on the use of land and arrangement of their territories.

Application
To apply
1. quantitative and qualitative methods of analysis in decision-making and build economic, financial, organizational and management models;
2. farm boundary phases that can form an scientifically based project;
3. feasibility studies of plans, projects and schemes of land use and real estate;
4. scientific research and production development using modern equipment, devices and methods of research in the field of land and property relations;
5. scheme design techniques and the use of land resources, land management schemes and other pre-and forward-looking materials.

Analysis
To analyze
1. options for land use planning schemes and land management projects, their effect on the rational and efficient use of land;
2. formation of land tenure and use of agricultural enterprises and farms;
3. concept of a system of land management, land use planning process, land management industry knowledge, land use planning: the content and principles of land use planning;

4. land and economic structure residential areas: the categories of urban land and their functions, the definition of areas for the location and development of residential, cultural, household, gardening and industrial zones.

Synthesis

To synthesise

1. feasibility study to establish the boundaries of land use;
2. design and implementation of programs developed, schemes and land management projects, to manage the course of the design process;
3. effective strategy and generate an active policy in the field of land and property relations.

Evaluation

To evaluate

1. the condition and use of land resources, predict the consequences of design decisions on land management;
2. Projects Spatial Planning and peasant agricultural enterprises (farms);
3. models of land management for describing and predicting the use of land and other property, to carry out their qualitative and quantitative analysis;
4. land and economic arrangement of the territory of settlements.

The following **curriculum** is presented:

Title of modules	Course code	Title of courses	Credit	ECTS/ hours	Lec/ prac/ Lab.	Sem.
Semester 1						
1. State Compulsory Module	HRK 1101	History of the Republic of Kazakhstan (1991-2013)	2	3/ 90	1+1+0	1
	K(R)LPP 1102	Kazakh (Russian) language for professional purposes	3	5/135	0+2+1	1
	FLPP 1103	Foreign language for professional purposes	3	5/135	0+2+1	1
3.1 Natural Sciences (STEM) module	IT1301	Information technologies for land surveying works	3	5/135	1+0+2	1
	Mat1302	Mathematics	3	5/135	2+0+1	1
3.2. Basic Professional Modules	**Module 1 – Topography**					
	Top1401	Topography	3	5/135	2+0+1	1
Semester 2						
3.1 Natural Sciences (STEM) module	CGDPM 1303	Computer graphic decoration of projects and maps	3	5/135	2+0+1	2
3.2. Basic Professional Modules	**Module - Economic Geography of Kazakhstan and geodesy**					
	EGRK1402	Economic Geography of the Republic of Kazakhstan	3	5/135	2+1+0	2
	GLM1403	Geodesy in land management	3	5/135	2+0+1	2
	Module - Cartography and basics of cadastre					
	SS1404	Soil science	3	5/135	2+0+1	2
	Kar1405	Cartography	3	5/135	2+0+1	2
	LC1406	Land cadastre	3	5/135	2+1+0	2
6. Additional Types of Learning	6.1	Physical Training	8	8/360	0+0+2	1,2, 3,4
4. Internship		Professional internship (by type of internship):				
	TP101	Training internship	4	6/180		2
Semester 3						
Name of modules	**Discipline code**	**Title of courses**	**Credit**	**ECTS/ hours**	**Lec/prac/Lab.**	**Sem.**
2. Social and Communica-	PIK 2201	Psychology of interindividual communication	2	3/ 90	1+1+0	3
	TAPS	Theoretical and applied political science	2	3/ 90	1+1+0	3

tive Module	2202					
	EPSS 2203	Ethics of individual and social success	2	3/ 90	1+1+0	3
	CR 2204	Culture and religion	2	3/ 90	1+1+0	3
	GAS 2205	General and applied sociology	2	3/ 90	1+1+0	3
	HLS 2206	Safety of human life	2	3/ 90	1+1+0	3
	ESD 2207	Ecology and sustainable development	2	3/ 90	1+1+0	3
	FE 2208	Basics of economics	2	3/ 90	1+1+0	3
	LSK 2209	Legal system of Kazakhstan	2	3/ 90	1+1+0	3
3.2. Basic Professional Modules	**Module - Basics of land management and geodesic instruments**					
	BLM2407	Basics of land management	3	5/135	2+1+0	3
	MGIE2408	Modern geodesic instruments and equipment	3	5/135	2+1+0	3
	Module - Basics of agricultural production and landscape-ecology in land management					
	BAP2409	Basics of agricultural production	3	5/135	2+1+0	3
	LEBLM2410	Landscape-ecological basis of land management	3	5/135	2+1+0	3
	Geo2411	Geoecology	2	3/ 90	1+1+0	3
Semester 4						
Name of modules	**Discipline code**	**Title of courses**	**Credit**	**ECTS/ hours**	**Lec/prac/Lab.**	**Sem.**
1. State Compulsory Module	FNP 2104	Philosophy of scientific cognition	2	3/ 90	1+1+0	4
3.2. Basic Professional Modules	**Module - Photogrammetry**					
	Fot2412	Photogrammetry	3	5/135	1+0+2	4
	BRS2413	Basics of remote sensing	3	5/135	1+0+2	4
	BEM2414	Basics of environmental monitoring	3	5/135	2+1+0	4
	Module - Land use planning and geodesic works in land management					
	GWLMC2415	Geodesic works in land management and cadastre	3	5/135	2+1+0	4
	LUP2416	Land use planning	3	5/135	2+0+1	4
3.4 Interdisciplinary Module	IE 01	Innovative Entrepreneurship (trade-wise)	2	3/ 90	1+1+0	4
	IPL 02	Intellectual Property Law	2	3/ 90	1+1+0	4
	LL 03	Land law	2	3/ 90	1+1+0	4
	SLT 04	System of land taxation	2	3/ 90	1+1+0	4
4. Internship		Professional internship (by type of internship):				
	IP202	Industrial internship	2			4
Semester 5						
3.2. Basic Pro-	**Module –Divisional and inter-farm land**					

fessional Modules	**management**					
	DLM3417	Divisional land management	3	5/135	2+0+1	5
	ILM3418	Inter-farm land management	3	5/135	2+0+1	5
3.3 Modules for Individual Educational Trajectories (Professional elective module) (IET)	IET 1 **Assessment and monitoring of land**	IET 2 **Land resources management**				
	SW3501 Scientific writing (kaz/rus/eng) 0+0+1	**SW3501 Scientific writing (kaz/rus/eng) 0+0+1**	1	1/45	5	
	SML3506 State monitoring of land 2+1+0	MLRM3506 Methods of land resource management 2+1+0	3	5/135	5	
	EGSL3507 Economic and geographical assessment of land 2+1+0	SCUPL3507 State control of using and protection of land 2+1+0	3	5/135	5	
	PATCS3508 Planning, arrangement of territory and cadastre of settlements 2+0+1	ELU3508 Economics of land using 2+0+1	3	5/135	5	
	CALS3509 Cadastral assessment of land settlements 2+1+0	SSMT3509 System of state management of territory 2+1+0	3	5/135	5	
Semester 6						
3.1 Natural Sciences (STEM) module	ASPA3304	Automated systems in professional activities	3	5/135	2+0+1	6
	Module - GIS in land management and management of land surveying works					
	MLSW3419	Management of land surveying works	3	5/135	2+1+0	6
	GDMLM3420	GIS and digital mapping in land management	3	5/135	2+0+1	6
3.3 Modules for Individual Educational Trajectories (Professional elective module) (IET)	IET 1 **Assessment and monitoring of land**	IET 2 **Land resources management**				
	TIREO3510 Technical inventory of real estate objects 2+1+0	TPLDC3510 Territorial planning of land of different categories 2+1+0	3	5/135	6	
	CAAL3511 Cadastral assessment of agricultural land 2+1+0	LMF 3511 Land management of farms	3	5/135	6	

			2+1+0				
	EAMLRE3512 Economic assessment mechanism of land and real estate 2+1+0		OLCW3512 Organization of land and cadastral works 2+1+0	3	5/135	6	
4. Internship		Professional internship (by type of internship):					
	IP303	Industrial internship		2	3/90	6	
Semester 7							
3.2. Basic Professional Modules	**Module - Intrafarm land management and planning of settlements**						
	ILMA4421	Intrafarm land management of agroformations		3	5/135	2+0+1	7
	LESPS4422	Land-economic structure and planning of settlements		3	5/135	2+0+1	7
	Module - Information systems designing and regional land management						
	ISDILM4423	Information systems designing in inter-farm land management		3	5/135	2+0+1	7
	RLMRK4424	Regional land management in the Republic of Kazakhstan		3	5/135	2+1+0	7
3.3 Modules for Individual Educational Trajectories (Professional elective module) (IET)	IET 1 **Assessment and monitoring of land**		IET 2 **Land resources management**				
	LMUGT4513 Land monitoring with using GIS technology 2+1+0		EIDT4513 Engineering infrastructure of the district territory 2+1+0	3	5/135	7	
	FLU4514 Forecast of land using 2+1+0		MDL4514 Market of divisional land 2+1+0	3	5/135	7	
Semester 8							
4. Internship		Professional internship (by type of internship):					
	IP404	Industrial internship		4	6/180		8
5. Final Certification	5.1	Preparation and Presentation of Bachelor's Dissertation (Diploma Project)		2	3/90		8

For the degree programme BSc Geodesy and Cartography, the self-assessment report states the following **intended learning outcomes**:

Knowledge
Bachelor of 5B071100 - Geodesy and Cartography should know:

- forms and types of cultures, patterns of their operation and development, the history of culture of Kazakhstan;
- the main sources of the emergence and development of mass social movements, factors of social development;
- ethical rules of law governing the relationship of man to man, society and the environment;
- general principles and technology of the topographic surveying, astronomical and geodetic and cartographic works;
- geodetic, photogrammetric and mapping equipment, technical means of satellite geodesy, computing and automated data processing used for surveys and mathematical processing of the results, and to create maps;
- issues of health and safety, basic rights and environmental protection laws, the basics of patenting and scientific organization of labor;
- methods and techniques of technical drawing and computer graphics.

Understanding
Bachelor of 5B071100 - Geodesy and Cartography should have an idea of:

- the place and the organization of cartography and geodesy production in the Republic of Kazakhstan;
- the scientific, philosophical and religious paintings of world view, ethical values;
- the processes and phenomena that occur in living and non-living nature;
- the nature and power of politics, political relations and processes;
- the main stages in the history of mankind and their history;
- a healthy lifestyle;
- the achievements of modern natural science, physical principles of modern technical devices;
- mathematics as a special way of understanding the world, its common concepts and ideas;
- information, its storage methods, the development and transfer;
- the current state and prospects of development of Geodesy and Cartography;
- the basic principles and forms of organization of cartography and geodesy production, planning and control taking into account the specifics of the topographic surveying and mapping activities;
- the basics of the theory and internship of Geodesy, Topography and Cartography, methods of topographic surveying and mapping activities and prospects for their development.

Application

Bachelor of 5B071100 - Surveying and mapping should be able to:

- work with geodetic, cartographic Stereophotogrammetric appliances and equipment;
- perform mathematical processing of geodetic and photogrammetric measurements;
- use the safety rules and safety in the field and laboratory conditions of production activities;
- use the Kazakh language as the state, for interpersonal communication and intercultural communication.
- Own:
- foreign language in oral and written form for communication in academic, scientific, professional, social and cultural spheres;
- specialty terminology in a foreign language.

Bachelor of 5B071100 - Geodesy and Cartography must have skills to:

- perform geodetic, topographic, astronomical and geodetic, photogrammetric and mapping activities;
- use computers and technology.

Bachelor of 5B071100 - Surveying and mapping must be competent:

- in the way of basic technological processes topographic surveying, aerial photogrammetry and mapping activities;
- in the methods of calculation of technical and economic efficiency in the choice of technical and organizational solutions for topographic and geodetic and cartographic production;
- in the field of modern technologies of obtaining survey information for mapping the country and upgrade the existing cartographic fund, including GIS and aerospace technology.

Analysis

Bachelor of 5B071100 - Geodesy and Cartography should know:

- method of execution and processing of topographic and geodetic measurements, the properties of aerial and satellite imagery, the principles of measurement results;
- methods for the various content of cartographic materials, issues of automating the creation of maps;
- the main natural hazards and technospheric, their properties and characteristics, the nature of the impact of hazards to humans and the environment, methods of protection against them in relation to the scope of their professional activities;
- knowledge in the field of information technology and the acquisition of skills in the Internet resources in order to improve their own professional development;
- to carry out topographical surveying, mapping the natural, natural and man-made socio-economic systems;
- to assess the accuracy of the results of geodetic measurements and mapping constructs;
- to carry out digital mapping using GIS software packages.

Synthesis

Bachelor of 5B071100 - Geodesy and Cartography must have skills to:

- interprete remote sensing data, drawing and engraving on plastics; adjustment of surveying instruments;
- work with computer technology as part of their specialty.

Bachelor of 5B071100 - Geodesy and Cartography must have:

- initiative and willingness to develop skills for the development of policies and internships in the development of group projects.

Bachelor of 5B071100 - Geodesy and Cartography must:

- know the basics of organizing and carrying out environmental monitoring of cartography for solving environmental and natural resource management.

Bachelor of 5B071100 - Surveying and mapping must be competent:

- in terms of technical Geodesy, Topography and Cartography;
- in the organization and implementation of cartographic production;
- in the newly developing areas of Geodesy, Topography and Cartography.

Bachelor of 5B071100 - Surveying and mapping should be able to:

- use cartographic and geodetic knowledge to solve topographic, geodesic and cartographic internships, guidelines and information retrieval tasks, and environmental objectives.

Bachelor of 5B071100 - Geodesy and Cartography should possess:

- modern methods of geographic, topographic surveying and mapping studies; own methods of topographic and geodetic measurements and calculations, mathematical and cartographic design and simulation;
- theory and internship of production of topographic and geodetic and cartographic work of modern Russian and world information on the problems of the development of the industry;
- knowledge of the fundamentals of geodesy, topography, cartography, geography, their role in the social development and be able to apply them to solve professional problems.

Bachelor of 5B071100 - Geodesy and Cartography should understand:

- the objectives, methodology and techniques of professional work in the field of engineering geodesy and cartography, own tools, methods of organizing and conducting topographic surveying and mapping activities.

Evaluation

Bachelor of 5B071100 - Geodesy and Cartography must:

- have basic theoretical analysis and forecasting of hazardous events and processes;
- be able to assess the effectiveness of the various areas of topographic and geodetic and cartographic production in a market economy, to know and be able to competently use in their professional activities terminology own methods of mathematical modeling in the creation of cartographic products;
- have basic structural and mathematical, system, topographic surveying, photogrammetric mapping and analysis, to know the basics of geographic information

technologies, economic and legal framework of land cadastre and cartography and geodesy production;

- be able to apply their knowledge to solve practical, methodical and information retrieval tasks, and environmental objectives;
- be able to analyze complex problems of applied science and finding viable solutions to apply the principles of technology and information security, information security, administration and organization of database security;
- own methods of determining the shape and size of the Earth and the breakdown of the state geodetic network of different classes, methods and techniques of mathematical processing of topographic and geodetic measurements, hold the methodology of cartography;
- be able to make projects and programs general geographic, thematic maps and other cartographic products; own methods and skills cartographic drawing and engraving, computer technology making geodetic and cartographic models;
- know the methods of remote sensing and interpretation of materials aerokosmosemki and be able to apply them to solve a variety of practical tasks and problem situations;
- own modern methods of mathematical and statistical analysis of data to process, analyze and synthesize geospatial data.

The following **curriculum** is presented:

Title of modules	Course code	**Title of courses**	Credit	**ECTS /hours units**	**Lec/prac/Lab.**	**Sem.**
Semester 1						
1. State Compulsory Module	HRK 1101	History of the Republic of Kazakhstan (1991-2013y.y.)	2	3/90	1+1+0	1
	K(R)LPP 1102	Kazakh (Russian) Language for Professional Purposes	3	5/135	0+3+0	1
	FLPP 1103	Foreign Language for Professional Purposes	3	5/135	0+2+1	1
3. Vocational Modules	**3.2. Basic Professional Modules**				5/135	
		The module - Geodesy bases		5/135		
	Geo 1401	Geodesy 1	3	5/135	1+0+2	1
		The module – Cartography and inventory bases		5/135		
	Car 1404	Cartography	3	5/135	1+0+2	1
	SS 1405	Soil Science	3	5/135	2+0+1	1
6. Additional Types of	6.1	Physical Training	2	3/90	0+0+2	1

Learning						
Semester 2						
3. Vocational Modules	**3.1 Natural Sciences (STEM) module**					
	MGC 1302	Mathematics in Geodesy and Cartography	3	5/135	1+2+0	2
	FBOED 1304	Physical Bases of Optical-Electronic Devices	3	5/135	1+2+0	2
		The module - Geodesy bases				
	MGE 1402	Modern Geodetic Equipment	2	3/90	0+0+2	2
	Geo 1403	Geodesy 2	3	5/135	1+0+2	2
		The module – Cartography and inventory bases				
	IB 1406	Inventory Bases	3	5/135	2+1+0	2
		The module - Applied geodesy				
	TPEG 1407	Topographical Plotting and Engineering Graphics	2	3/90	0+0+2	2
	ASP 2409	The Automated Systems of Processing	2	3/90	0+0+2	2
		The module - Geodetic measurements and their processing				
	TMPGM 1410	Theory of Mathematical Processing of Geodetic Measurements	3	5/135	1+2+0	2
4. Internship		Professional Internship (by types of internship)				
	EGP 101	Educational Geodetic Internship	8			2
6. Additional Types of Learning	6.1	Physical Training	2	3/90	0+0+2	2
Semester 3						
2. Social and Communicative **M**odule (4 credits)	PIC 2201	Psychology of Interpersonal Communication	2	3/90	1+1+0	3
	TAPS 2202	Theoretical and Applied Political Science	2	3/90	1+1+0	3
	EPSS 2203	Ethics of Personal and Social Success	2	3/90	1+1+0	3
	CR 2204	Culture and Religion	2	3/90	1+1+0	3
	GAS 2205	General and Applied Sociology	2	3/90	1+1+0	3
	HLS 2206	Human Life Safety	2	3/90	1+1+0	3
	ESD 2207	Ecology and Sustainable Development	2	3/90	1+1+0	3
	KL 2208	Kazakhstan Law	2	3/90	1+1+0	3
	FE 2209	Fundamentals of Economics	2	3/90	1+1+0	3
3. Vocational Modules	**3.1 Natural Sciences (STEM) module**					
	Geo 2301	Geoinformatics	3	5/135	1+0+2	3

		The module - Applied geodesy				
	EG 2408	Engineering Geodesy	3	5/135	1+0+2	3
	HG 2411	The Highest Geodesy	3	5/135	1+0+2	3
	3.4 Interdisciplinary Module		4			
	IE 2601	Innovative Entrepreneurship (trade-wise)	2	3/90		3
	IPL 2602	Intellectual Property Law	2	3/90		3
	AB 2603	Archeology Bases	2	3/90		3
	GH 2604	General Hydrology	2	3/90		3
6. Additional Types of Learning	PC	Physical Culture	2	3/90	0+0+2	3
Semester 4						
1. State Compulsory Module (10 credits)	PhSK 2104	Philosophy of Scientific Knowledge	2	3/90	1+1+0	4
3. Vocational Modules		**The module - Photogrammetry**				
	Phot 2412	Photogrammetry	3	5/135	1+0+2	4
	BRS 2413	Bases of Remote Sensing	3	5/135	1+0+2	4
	BME 2414	Bases of Monitoring of Environment	3	5/135	2+1+0	4
		The module – Information technologies				
	DB 2415	Database	3	5/135	1+0+2	4
		The module – the Relief and relief the forming processes				
	GGB 2417	Geomorphology with Geology Bases	3	5/135	2+0+1	4
	GP 2418	Geodynamic Processes	3	5/135	1+0+2	4
4. Internship		Professional Internship (by types of internship)				
	SEP 202	Special Educational Internship	8			4
6. Additional Types of Learning	PC	Physical Culture	2	3/90	0+0+2	4
Semester 5						
3. Vocational Modules		**The module – Information technologies**				
	DSSIT 2416	Development and Standardization of Software and Information Technologies	3	5/135	1+0+2	5
		The module – Space methods of researches				
	SMS 3419	Space Methods of Shooting	3	5/135	1+0+2	5
3.3 Modules for Individual Educational Trajectories (IET) (CC)						

	IOT 1 - **Cartography**	IOT 2 - **Geoinformatics**	IOT 3 - **Applied geodesy**	IOT 4 - **Space geodesy and cartography**		
	GPG 3502 General Physical Geography (1+1+0)	GIST 3502 GIS Tools (1+0+1)	GTS 3502 Geodetic Tool-Study (1+0+1)	RSNR 3502 Remote Sensing of Natural Resources (1+0+1)	3/90	5
	EOCGP 3503 Economy and the Organization of the Cartographer – Geodetic production (1+0+2)	Geo 3503 Geoiconics (1+0+2)	EGR 3503 Engineering and Geodetic Researches (1+0+2)	IP 3503 Interpretation of Pictures (1+0+2)	5/135	5
	TM 3504 Thematic Maps (1+0+2)	Geo 3504 Geomatiks (1+0+2)	GTS 3504 Surveying instruments (1+0+2)	HSERS 3504 Hyper Spectral Equipment of Remote Sensing (1+0+2)	5/135	5
	MC 3505 Mathematical Cartography (2+0+1)	CBDDCI 3505 Creation of Base and Databank of Digital Cartographical Information (1+0+2)	TCP 3505 Technology of Construction Production (2+0+1)	GA 3505 Geodetic Astronomy (1+0+2)	5/135	5
Semester 6						
3. Vocational Modules	**3.1 Natural Sciences (STEM) module**					
	SF 3303	Space Physics	3	5/135	1+2+0	6
		The module – Space methods of researches				
	APSI 3420	Automation of Processing of Space Information	3	5/135	1+0+2	6
		The module - Digital mapping				
	TCDC 3421	Technology of Creation of Digital Cards	3	5/135	1+0+2	6
3.3 Modules for Individual Educational Trajectories (IET) (CC)						
	IOT 1 - **Cartography**	IOT 2 - **Geoinformatics**	IOT 3 - **Applied geodesy**	IOT 4 - **Space geodesy and cartography**		
	DM 3506 Design Map (1+0+2)	GMK 3506 Geoinformation Mapping of Kazakhstan (1+2+0)	GWCC 3506 Geodetic Works at Construction of Constructions (1+0+2)	SGC 3506 Space Geodesy and Cartography (1+0+2)	5/135	6
	GISC 3507 GIS in Cartography (1+0+2)	TGISUTM 3507 Technology GIS in Updating of Topographic maps (1+0+2)	SODC 3507 Supervision Over Deformations of Constructions (1+0+2)	LESGC 3507 Laser Equipment in Space Geodesy and Cartography (1+0+2)	5/135	6
	DDM 3508 Design and	DMDM 3508 Digital Models and	GEICWCC 3508 Geodetic Ensuring	SM 3508 Space Mapping	5/135	6

	Drawing up Maps (1+0+2)	District Maps (1+0+2)	Installation and Construction Works and Control in Construction (1+0+2)	(1+0+2)		
4. Internship	Professional Internship (by types of internship)					
	WP 303	Work Internship	2			6
Semester 7						
3. Vocational Modules		**The module - Digital mapping**				
	TC3DVC 3422	Technology of Creation of 3D Virtual Cards	3	5/135	1+0+2	7
		The module – Navigation systems				
	SNS 4423	Satellite Navigation Systems	3	5/135	1+0+2	7
	DTMDRS 4424	Digital Technologies of Monitoring by Data Remote Sensing	3	5/135	1+0+2	7
3.3 Modules for Individual Educational Trajectories (IET) (CC)						
	ц	IOT 2 - **Geoinformatics**	IOT 3 - **Applied geodesy**	IOT 4 - **Space geodesy and cartography**		
	SW 3501 Scientific writing (kaz/rus/eng) 0+0+1	SW 3501 Scientific writing (kaz/rus/eng) 0+0+1	SW 3501 Scientific writing (kaz/rus/eng) 0+0+1	SW 3501 Scientific writing (kaz/rus/eng) 0+0+1	1,6/45	7
	EM 3509 Ecological Mapping (2+0+1)	MCPPCTM 3509 Methods of Computer Processing of Pictures for Creation of Thematic Maps (1+0+2)	Gra 3509 Gravimetry (1+0+2)	SF 3509 Space Fotogrammetriya (1+0+2)	5/135	7
	SM 3510 Satiny Mapping (1+0+2)	CMG 3510 Cartographical Models of Geosystems (1+0+2)	SAD 3510 Systems of the Automated design (1+0+2)	OMSGC 3510 Orbital Methods in Space Geodesy and Cartography (1+0+2)	5/135	7
	GT 3511 Geographical Toponymics (1+0+2)	DGISU 3511 Design and GIS Use (1+0+2)	ASGM 3511 The Automated Systems of Geodetic Measurements (1+0+2)	SN 3511 Space Navigation (2+0+1)	5/135	7
Semester 8						
4. Internship		Professional Internship (by types of internship)				
	Ext 404	Externship	2			8
5. Final Certification	PPBD	Preparation and Presentation of Bachelor's Dissertation (Diploma Project)	2	3/90		

For the degree programme MSc Geodesy, the self-assessment report states the following **intended learning outcomes**:

Application

Master of specialty 6M071100 - Geodesy

The graduate should have a fundamental scientific training, own modern information technologies, including methods of obtaining, processing and storage of scientific information and be able to organize to conduct research activities in selected scientific specialty, teaching at universities, to successfully carry out research and management activities, be able to be part of the joint research research, have a creative style of thinking.

Own:

- foreign language in oral and written form for communication in academic, scientific, professional, social and cultural spheres;
- specialty terminology in a foreign language.

Master of specialty 6M071100 - Geodesy must have skills to:

- perform geodetic, topographic, astronomical and geodetic, photogrammetric and mapping activities;
- use computers and technology.

Master of specialty 6M071100 - Geodesy must be competent:

- in the way of basic technological processes topographic surveying, aerial photogrammetry and mapping activities;
- in the methods of calculation of technical and economic efficiency in the choice of technical and organizational solutions for topographic and geodetic and cartographic production;
- in the field of modern technologies of obtaining survey information for mapping the country and upgrade the existing cartographic fund, including GIS and aerospace technology.

Analyze

Master of specialty 6M071100 - Geodesy should know:

- methods of execution and processing of topographic and geodetic measurements, the properties of aerial and satellite imagery, the principles of measurement results;

- methods of the various content of cartographic materials, issues of automating the creation of maps;
- the main natural hazards and technospheric, their properties and characteristics, the nature of the impact of hazards to humans and the environment, methods of protection against them in relation to the scope of their professional activities;
- knowledge in the field of information technology and the acquisition of skills in the Internet resources in order to improve their own professional development;
- to carry out topographical surveying, mapping the natural, natural and man-made socio-economic systems;
- to assess the accuracy of the results of geodetic measurements and mapping constructs;
- to carry out digital mapping using GIS software packages.

Synthesis

Master of specialty 6M071100 - Geodesy must have skills:

- to interprete remote sensing data, drawing and engraving on plastics; adjustment of surveying instruments;
- to work with computer technology as part of their specialty.

Master of specialty 6M071100 - Geodesy must have:

- initiative and willingness to develop skills for the development of policies and internships in the development of group projects.

Master of specialty 6M071100 - Geodesy must:

- know the basics of organizing and carrying out environmental monitoring of cartography for solving environmental and natural resource management.

Master of specialty 6M071100 - Geodesy must be competent:

- in terms of technical Geodesy, Topography and Cartography;
- in the organization and implementation of cartographic production;
- in the newly developing areas of Geodesy, Topography and Cartography.

Master of specialty 6M071100 - Geodesy should be able to:

- use cartographic and geodetic knowledge to solve topographic, geodesic and cartographic internships, guidelines and information retrieval tasks, and environmental objectives.

Master of specialty 6M071100 - Geodesy should own:

- the methods of compilation of environmental maps for the areas of nature reserves, natural and archaeological sites; cards unfavorable relief-forming processes, and methods of preparation of the inventory, assessment and prediction maps and maps of decision-making with the help of modern GIS technology.

Master of specialty 6M071100 - Geodesy should understand:

- the objectives, methodology and techniques of professional work in the field of engineering geodesy and cartography, own tools, methods of organizing and conducting topographic surveying and mapping activities.

Assessment

Master of specialty 6M071100 - Geodesy must:

- have basic theoretical analysis and forecasting of hazardous events and processes;
- be able to assess the effectiveness of the various areas of topographic and geodetic and cartographic production in a market economy, to know and be able to competently use in their professional activities terminology own methods of mathematical modeling in the creation of cartographic products;
- have basic structural and mathematical, system, topographic surveying, photogrammetric mapping and analysis, to know the basics of geographic information technologies, economic and legal framework of land cadastre and cartography and geodesy production;
- be able to apply their knowledge to solve practical, methodical and information retrieval tasks, and environmental objectives;
- be able to analyze complex problems of applied science and finding viable solutions to apply the principles of technology and information security, information security, administration and organization of database security;
- own methods of determining the shape and size of the Earth and the breakdown of the state geodetic network of different classes, methods and techniques of mathematical processing of topographic and geodetic measurements, hold the methodology of cartography;
- be able to make projects and programs general geographic, thematic maps and other cartographic products; own methods and skills cartographic drawing and engraving, computer technology making geodetic and cartographic models;

- know the methods of remote sensing and interpretation of materials aero images and be able to apply them to solve a variety of practical tasks and problem situations;
- own modern methods of mathematical and statistical analysis of data to process, analyze and synthesize geospatial data.

The following **curriculum** is presented:

Module Code	Module Name	Credits	Discipline Code	Discipline	ECTS /hours units	Credits	L+P+Lb	L+P+Lb	L+P+Lb	L+P+Lb
							semesters			
Compulsory State Modules – 8 credits =13 ESTC							I	II	III	IV
OGM1	Compulsory State Module 1	4	IFN 5201	History and Philosophy of Science	6/180	2	1+1+0			
			Iya(p)5202	Foreign language (Professional)		2	1+1+0			
OGM 2	Compulsory State Module 2	4	Ped 5203	Pedagogics	6/180	2		1+1+0		
			Psy 5204	Psychology		2		1+1+0		
Compulsory Professional Modules - 14 credits – 23 ESTC										
OPM 1	Compulsory Professional Module 1	2	GSGK 5305	Geoinformation Systems in Geodesy and Cartography	3/90	2	1+1+0			
OPM 2	Compulsory Professional Module 2	3	OPNI 5206	Organization and Planning of Scientific Research	5/135	3	2+1+0			
OPM 3	Compulsory Professional Module 3	3	GIDGP 5207	Geodetic Researches of Dynamics of Geomorphological Processes	5/135	3	1+2+0			
OPM 4	Compulsory Professional Module 4	3	PG 5208	Phisical Geodesy	5/135	3	1+2+0			
OPM 5	Compulsory Professional Module 5	3	KG 5209	Cosmic Geodesy	5/135	3		1+2+0		
Modules of Individual Educational Paths – 20 credits = 33 ESTC										

MIOT 1	Module of Individual Educa-tional Path 1	4	5301	Electives	3/90	2		2		
			5302	Electives	3/90	2		2		
MIOT 2	Module of Individual Educa-tional Path 2	4	5303	Electives	3/90	2		2		
			5304	Electives	3/90	2		2		
MIOT 3	Module of Individual Educa-tional Path 3	6	6305	Electives	5/135	3			3	
			6306	Electives	5/135	3			3	
MIOT 4	Module of Individual Educa-tional Path 4	6	6307	Electives	5/135	3			3	
			6308	Electives	5/135	3			3	
				Total: Theoretical Training - 42 credits (63 ECTS)		42	15	15	12	0
Additional Types of Training 13 credits = 22 ESTC										
Module Code	Module Name	Module weight	Module Com-ponent Code	Module Component Name	**ECTS /hours units**	Credits	I	II	III	IV
NIRM	Master's Reseach Work and Fullfilment of Disser-tation	7	NIRM I	Research Seminar I	1,6/45	1	1			
			NIRM II	Research Seminar II	1,6/45	1		1		
			NIRM III	Research Seminar III	1,6/45	1			1	
			NIRM IV	Research Seminar IV	6/180	4				4
PP	Profes-sional	6	PP	Pedagogical Internship	5/135	3			3	
			IP	Research internship	5/135	3(1+2)	1			2

	Internship									
				Total: Additional Types of Training: 13 credits (22 ECTS)		13	2	1	4	6
Final Attestation 4 credits = 7 ESTC										
FSA	Final At-testation	4	KE	Complex Examination (1 credit)	1,6/45	1				1
			ZD	Dissertation Fulfilment and Defence (3 credits)	5/135	3				3
				Grand Total: 59 credits (98 ECTS)		59	17	16	16	10

Educational Program 6M071101 – Applied Geodesy

Module code	Module name	Discipline code	Discipline name	ECTS /hours units	Semester	Prerequisites
MIOT 1	Modern methods in the field of geodesy	MPFG 5301	Modern Problems in the Field of Geodesy	3/90	2	Geodetic Researches of Dynamics of Geomorphological Processes
		EGR 5302	Engineering and Geodetic Researches	3/90	2	Phisical Geodesy
MIOT 2	Methods of Creation of the State Geodetic Networks	MGSGN 6303	the State Geodetic Networks	3/90	2	Geo 1203 Geodesy 1,2, IG 2303 Engineering geodesy, VG 2302 Higher geodesy
		MDPBT6304	Monitoring of Deformation Processes in the Built-up Territories	3/90	2	Geo 1203 Geodesy 1,2, IG 2303 Engineering geodesy, VG 2302 Higher geodesy
MIOT 3	Modern Geodetic Devices and Technologies	MGDT6305	Modern Geodetic Devices and Technologies	5/135	3	Geo 1203 Geodesy 1,2, IG 2303 Engineering geodesy, VG 2302 Higher geodesy
		GEICWCC6306	Geodetic Ensuring Installation and Construction Works and Control in Construction	5/135	3	Engineering and Geodetic Researches
MIOT 4	Automation of Geodetic Measurements	AGM6307	Automation of Geodetic Measurements	5/135	3	Geoinformation Systems in Geodesy and Cartography
		SAD6308	Systems of the Automated Design	5/135	3	Geoinformation Systems in Geodesy and Cartography

Educational Program 6M071102 – Geoinformation Geodesy

Module code	Module name	Discipline code	Discipline name	ECTS /hours units	Semestr	Prerequisites
MIOT 1	GIS Tools	GIST 5301	GIS Tools	3/90	2	Geoinformation Systems in Geodesy and Cartography
		BGIST 5302	Bases of GIS and Technologies	3/90	2	Geoinformation Systems in Geodesy and Cartography
MIOT 2	Databases of Geoinformation Systems	DGS 6303	Databases of Geoinformation Systems	3/90	2	Geoinformation Systems in Geodesy and Cartography
		GIS 6304	Geodetic Information Systems	3/90	2	Geo 1203 Geodesy 1,2, IG 2303 Engineering geodesy, HG 2302 Higher geodesy, Geoinformation systems in geodesy and cartography
MIOT 3	Geodetic Providing Geoinformation Systems	ISS 6305	Information Satellite Systems	5/135	3	Geo 1203 Geodesy 1,2, IG 2303 Engineering geodesy, HG 2302 Higher geodesy, Space geodesy
		GPGS 6306	Geodetic Providing Geoinformation Systems	5/135	3	Geo 1203 Geodesy 1,2, IG 2303 Engineering geodesy, HG 2302 Higher geodesy, Geoinformation systems in geodesy and cartography
MIOT 4	Satellite Geodesy	SG 6307	Satellite Geodesy	5/135	3	Geo 1203 Geodesy 1,2, IG 2303 Engineering geodesy, HG 2302 Higher geodesy, Space geodesy
		DBG 6308	Design of Bases of Geodata	5/135	3	Geo 1203 Geodesy 1,2, IG 2303 Engineering geodesy, HG 2302 Higher geodesy, Geoinformation systems in geodesy and cartography

For the degree programme MSca Cartography, the self-assessment report states the following **intended learning outcomes**:

Application

Master of specialty 6M074100 - Cartography should be able to:

- to work with geodetic, cartographic Stereophotogrammetric appliances and equipment;
- perform mathematical processing of geodetic and photogrammetric measurements;
- to use the safety rules and safety in the field and laboratory conditions of production activities;
- to use the Kazakh language as the state, for interpersonal communication and intercultural communication;

Own:

- foreign language in oral and written form for communication in academic, scientific, professional, social and cultural spheres;
- specialty terminology in a foreign language.
- Master of specialty 6M074100 - Cartography should have the skills to:
- to perform geodetic, topographic, astronomical and geodetic, photogrammetric and mapping activities;
- to use computers and technology.

Master of specialty 6M074100 - Cartography should be competent:

- in the way of basic technological processes topographic surveying, aerial photogrammetry and mapping activities;
- in the methods of calculation of technical and economic efficiency in the choice of technical and organizational solutions for topographic and geodetic and cartographic production;
- in the field of modern technologies of obtaining survey information for mapping the country and upgrade the existing cartographic fund, including GIS and aerospace technology.

Analysis

Master of specialty 6M074100 - Cartography should know:

- method of execution and processing of topographic and geodetic measurements, the properties of aerial and satellite imagery, the principles of measurement results;
- methods for the various content of cartographic materials, issues of automating the creation of maps;
- the main natural hazards and technospheric, their properties and characteristics, the nature of the impact of hazards to humans and the environment, methods of protection against them in relation to the scope of their professional activities;
- knowledge in the field of information technology and the acquisition of skills in the Internet resources in order to improve their own professional development;
- to carry out topographical surveying, mapping the natural, natural and man-made socio-economic systems;
- to assess the accuracy of the results of geodetic measurements and mapping constructs;
- to carry out digital mapping using GIS software packages.

Synthesis

Master of specialty 6M074100 - Cartography should have the skills to:

- interprete remote sensing data, drawing and engraving on plastics; adjustment of surveying instruments;
- work with computer technology as part of their specialty.

Master of specialty 6M074100 - Cartography should have:

- initiative and willingness to develop skills for the development of policies and internships in the development of group projects.

Master of specialty 6M074100 - Cartography should:

- know the basics of organizing and carrying out environmental monitoring of cartography for solving environmental and natural resource management.

Master of specialty 6M074100 - Cartography should be competent:

- in terms of technical Geodesy, Topography and Cartography;
- in the organization and implementation of cartographic production;
- in the newly developing areas of Geodesy, Topography and Cartography.

Master of specialty 6M074100 - Cartography should be able to:

- use of cartographic and geodetic knowledge to solve topographic, geodesic and cartographic internships, guidelines and information retrieval tasks, and environmental objectives.

Master of specialty 6M074100 - Cartography should possess:

- the methods of compilation of environmental maps for the areas of nature reserves, natural and archaeological sites; cards unfavorable relief-forming processes, and methods of preparation of the inventory, assessment and prediction maps and maps of decision-making with the help of modern GIS technology.

Master of specialty 6M074100 - Cartography should understand:

- the objectives, methodology and techniques of professional work in the field of engineering geodesy and cartography, own tools, methods of organizing and conducting topographic surveying and mapping activities.

Assessment

Master of specialty 6M074100 - Cartography should:

- have basic theoretical analysis and forecasting of hazardous events and processes;
- be able to assess the effectiveness of the various areas of topographic and geodetic and cartographic production in a market economy, to know and be able to competently use in their professional activities terminology own methods of mathematical modeling in the creation of cartographic products;
- have basic structural and mathematical, system, topographic surveying, photogrammetric mapping and analysis, to know the basics of geographic information technologies, economic and legal framework of land cadastre and cartography and geodesy production;
- be able to apply their knowledge to solve practical, methodical and information retrieval tasks, and environmental objectives;
- be able to analyze complex problems of applied science and finding viable solutions to apply the principles of technology and information security, information security, administration and organization of database security;
- own methods of determining the shape and size of the Earth and the breakdown of the state geodetic network of different classes, methods and techniques of mathematical processing of topographic and geodetic measurements, hold the methodology of cartography;

- be able to make projects and programs general geographic, thematic maps and other cartographic products; own methods and skills cartographic drawing and engraving, computer technology making geodetic and cartographic models;
- know the methods of remote sensing and interpretation of materials aerospace images and be able to apply them to solve a variety of practical tasks and problem situations;
- own modern methods of mathematical and statistical analysis of data to process, analyze and synthesize geospatial data.

The following **curriculum** is presented:

Module Code	Module Name	Module weight	Discipline Code	Discipline	ECTS /hours units	Credits	L+P+Lb	L+P+Lb	L+P+Lb	L+P+Lb
							semesters			
Compulsory State Modules – 8 credits =13 ESTC							I	II	III	IV
OGM1	**Compulsory State Module 1**	**4**	**IFN 5201**	History and Philosophy of Science	6/180	2	1+1+0			
			Iya(p)5202	Foreign language (Professional)		2	1+1+0			
OGM 2	**Compulsory State Module 2**	**4**	**Ped 5203**	Pedagogics	6/180	2		1+1+0		
			Psy 5204	Psychology		2		1+1+0		
Compulsory Professional Modules - 14 credits – 23 ESTC										
OPM 1	Compulsory Professional Module 1	2	PTMSK5301	Problems of the theory and methodology of modern cartography	3/90	2	1+1+0			
OPM 2	Compulsory Professional Module 2	3	OPNI 5206	Organization and Planning of Scientific Research	5/135	3	2+1+0			
OPM 3	Compulsory Professional Module 3	3	GSK 5207	Application of GIS and Remote Sensing Cartography	5/135	3	1+2+0			
OPM 4	Compulsory Professional Module 4	3	GSK 5208	GIS in Cartography	5/135	3	1+2+0			
OPM 5	Compulsory Professional Module 5	3	KIGPI5209	Cartographic Study of Geodynamic processes	5/135	3		1+2+0		

Modules of Individual Educational Paths – 20 credits = 33 ESTC										
MIOT 1	Module of Individual Educational Path 1	4	5301	Electives	3/90	2		2		
			5302	Electives	3/90	2		2		
MIOT 2	Module of Individual Educational Path 2	4	5303	Electives	3/90	2		2		
			5304	Electives	3/90	2		2		
MIOT 3	Module of Individual Educational Path 3	6	6305	Electives	5/135	3			3	
			6306	Electives	5/135	3			3	
MIOT 4	Module of Individual Educational Path 4	6	6307	Electives	5/135	3			3	
			6308	Electives	5/135	3			3	
				Total: Theoretical Training - 42 credits (63 ECTS)		42	15	15	12	0
Additional Types of Training 13 credits = 22 ESTC										
Module Code	Module Name	Module weight	Module Component Code	Module Component Name	**ECTS /hours units**	Credits	I	II	III	IV
NIRM	Master's Reseach Work and Fullfilment of Dissertation	7	NIRM I	Research Seminar I	1,6/45	1	1			
			NIRM II	Research Seminar II	1,6/45	1		1		
			NIRM III	Research Seminar III	1,6/45	1			1	
			NIRM IV	Research Seminar IV	6/180	4				4

PP	Profes-sional Internship	6	PP	Pedagogical Internship	5/135	3			3	
			IP	Research internship	5/135	3(1+2)	1			2
				Total: Additional Types of Training: 13 credits (22 ECTS)		13	2	1	4	6
Final Attestation 4 credits = 7 ESTC										
FSA	Final At-testation	4	KE	Complex Examination (1 credit)	1,6/45	1				1
			ZD	Dissertation Fulfilment and Defence (3 credits)	5/135	3				3
				Grand Total: 59 credits (98 ECTS)		59	17	16	16	10

Educational Program 6M074101 – Thematic of Cartography

Module code	Module name	Discipline code	Discipline name	ECTS /hours units	Semestr	Prerequisites
MIOT 1	Computer programs in cartography	POK 5301	Mapping Software	3/90	2	Geoin2305 Geoinformatics
		MCK 5302	Modeling In Modern Cartogra-phy	3/90	2	SK2306 Digital Cartography
MIOT 2	Methods For Creating Atlases	CEA 5303	Creation of Electronic Atlases	3/90	2	SK2306 Digital Cartography
		KMI 5304	Cartographic Research Meth-ods	3/90	2	Cart2004 Cartographic
MIOT 3	Cartographic of the Geo-dynamic processes	MIKSI 6305	Methods Of Study And Map-ping Of Seismic Events	5/135	3	GBG2006Geology of the basics of geomorphology
		KMI 5304	Mapping of the Platform-Denudation Plains	5/135	3	GBG2006Geology of the basics of geomorphology
MIOT 4	Satellite Navigation Sys-tems And Designing Cards	SNS6307	Satellite Navigation Systems	5/135	3	MAS 3306Methods for Aerospace Survey
		PTPK 6308	The Design And Technology Of Cards	5/135	3	PSK 3004DM 3004Designing and mapping

Educational Program - 6M074102 -GIS mapping

Module code	Module name	Discipline code	Discipline name	ECTS /hours units	Semestr	Prerequisites
MIOT 1	Mapping of Thematic Maps	APTK 5201	Automated Construction of Thematic Maps	3/90	2	Geoin2305 Geoinformatics
		MK5202	Space Mapping	3/90	2	MAS3001Methods for Aerospace Survey
MIOT 2	Mapping of Urban and Natural	KOPT 5303	Mapping of Protected Territory	3/90	2	Geoinformation Systems in Geodesy and Cartography
		UTKK 5304	Mapping urban areas	3/90	2	2305Regional Geography of Kazakhstan and mapping
MIOT 3	Modelling In Modern Cartography	'TMSK 6305	Three-dimensional Modelling in Modern Cartography	5/135	3	MAS3001Methods for Aerospace Survey
		SMMKS 6306	Digital Terrain Modeling of Satellite Imagery	5/135	3	MAS3001Methods for Aerospace Survey
MIOT 4	Contemporary Processes of Cartographic	KIGP6307	Creating the multimedia atlases	5/135	3	AK3316 Atlas mapping
		ATPPK 6305	Automation of technological processes and production in cartography	5/135	3	SK2306 Digital Cartography

For the degree programme BSca Meteorology, the self-assessment report states the following **intended learning outcomes**:

Knowledge

1. Knowledge of the main aspects of hydrometeorological terminology, nomenclature, codes, agreements and units
2. knowledge and understanding the physical and chemical processes proceeding in the atmosphere and the hydrosphere
3. studying of a subject of meteorology and its communication with geography, and meteorology place in system of sciences about the earth.
4. studying of a subject of meteorology and its communication with geography, and meteorology place in system of sciences about the earth.
5. Definition of refraction and reflection of light beams in drops and crystals of clouds, light diffraction in clouds and a fog
6. Application of necessary administrative decisions in the field of use of climatic resources;
7. Studying of approaches, methods and ways of economic estimates of rational use of natural resources and the ecological damage caused by economic activity.

Understanding

1. Discussion of features of fluctuations and climate changes, preparations of characteristics of climate for long-term weather forecasts and service of economic activity
2. Understanding of weather conditions of flights at various heights and in various geographical areas
3. Understanding of features of the general circulation of the atmosphere,
4. organize a rational meteorological network of supervision;
5. Discuss factors of adverse weather conditions and to define the effective nature protection actions directed on preservation of quality of atmospheric air

Application

1. to carry out collecting necessary hydrometeorological information and its analysis
2. Classification of atmospheric movements. Orders of the main meteorological sizes and their derivatives. Friedman-Gesselberga table.
3 . Code application KN – 01. Interpretation of synoptic telegrams and drawing up a ground weather map. Weather map reading
4 . to realize the social importance future professions;
5 . Stations of quality control of the atmosphere like "SKAT", appointment and technical characteristics
6. to estimate prospects of development of specialized meteorological support of branches of economy.
7. Ability to use and protect renewable and non-renewable natural resources, to apply economic instruments of greening of economy, to count economic efficiency of protection of the atmosphere from pollution, to estimate economic damage.

8. Ability to develop programs of monitoring of environment for different types of economic development of territories; to process and analyze results of monitoring; to project nature protection actions.

Analysis

1. to analyze socially significant problems and processes
2. to carry out monitoring of a condition of the atmosphere in real time, including with use of radar and satellite supervision;
3. Comparative analysis of these measurements of atmospheric pressure different devices (barometer, BRS).
4. Categorize hydrometric measurement in fieldwork conditions.
5. Compare hydrometric data result of observation. Examine hydrological mode of river systems.
6. Differential characteristics of meteorological fields: "individual or full, private or local, geometrical derivative; gradient of a scalar field; mathematical and meteorological gradients.
7. the analysis of climatic conditionality of natural and ecological conditions of Kazakhstan for the solution of problems of conservation
8. The comparative analysis of critical speeds of the wind causing the maximum concentration of harmful substances, in a ground layer of air from single sources of emission

Synthesis

1. knows and understands the physical and chemical processes proceeding in the atmosphere and the hydrosphere;
2. estimate the main aspect of hydrometeorological terminology
3. Create speed of chemical reactions; solutions and complex connections.
4. Planning and organization permanent and expeditionary hydrometric researches and its tasks. Control condition equipment hydrometric observation points.
5. Assessment of differential characteristics of meteorological fields
6. knows and understands the physical and chemical processes proceeding in the atmosphere and the hydrosphere;

Evaluation

1. to estimate risk of their realization, to choose methods of protection against dangers and ways of providing comfortable conditions of activity
2 . Calculation of speed of geostrophic, gradient and valid winds
3 . to estimate risk of their realization, to choose methods of protection against dangers and ways of providing comfortable conditions of activity
4 . Estimate the physical and geographical location of territories
5 . Protect the received digital data , applied methods and techniques
6. Evaluate the significance of the calculated indicators for the adequacy and forecasting information

The following **curriculum** is presented:

Title of module	Code of discipline	Title of subjects (modules) and type of activity	Number of credits	ECTS/ hours	L/P/L	Sem.
Semester 1						
1. State compulsory module (10 credits)	HRK 1101	History of the Republic of Kazakhstan	2	3/90	1+1+0	1
	K (R)LPP 1102	Kazakh (Russian) language for professional purposes	3	5/135	0+2+1	1
	FLPP 1103	Foreign language for professional purposes	3	5/135	0+2+1	1
3. Block vocational modules (116 credits)	**3.1 Natural science (STEM) module**		12	20/540		
	HM 1302	Higher Mathematics	3	5/135	2+0+1	1
	Module 2 - Theoretical aspects of hydrology					
	MMM 1405	Metods of meteorological measurements	3	5/135	2+0+1	1
	PM 1412	Physical meteorology I	3	5/135	2+0+1	1
6. Additional types of training	PT	Sport and Recreation	2	3/90	0+0+2	1
Semester 2						
3. Block vocational modules (116 credits)	**3.1 Natural science (STEM) module**		**12**	**20/ 540**		
	PhESGK 1401	Physical, economical and social geography of Kazakhstan	3	5/135	2+0+1	2
	Phys 1303	Physics	3	5/135	2+0+1	2
	3.2 Basic vocational modules		**75**			
	Module 1 – Applied aspects of meteorology					
	PhESGK 1401	Physical, economical and social geography of Kazakhstan	3	5/135	2+0+1	2
	ChA 2304	Chemistry of Atmosphere	3	5/135	2+0+1	2
	MTMM 1406	Modern technical means in meteorology	3	5/135	2+0+1	2
	LPWM 1407	Laboratory practical work on meteorology	2	3/90	0+0+2	2
	PM 1413	Physical meteorology II	3	5/135	2+0+1	2
	4.1c	Professional internship	**12**	**20/540**		
4. Internship	EP 101	Educational internship	8	13/360		2
3.4 Interdisciplinary Module	Geo1601	Geophysics	2	3/90	1+0+1	2
	Geo1602	Geoecology	2	3/90	1+0+1	2
	IB1603	Innovative business (on branches)	2	3/90	1+0+1	2
	IR1604	Intellectual right	2	3/90	1+0+1	2
6. Additional types of training	PT	Sport and Recreation	**8**	13/360	0+0+2	3
Semester 3						
2. Social - communica-	PIC 2201	Psychology of Interpersonal Communication	2	3/90	1+1+0	3

tive module (4 credits)	TAPS 2202	Theoretical and Applied Political Science	2	3/90	1+1+0	3
	EPSS 2203	Ethics of Personal and Social Success	2	3/90	1+1+0	3
	CR 2204	Culture and Religion	2	3/90	1+1+0	3
	GAS 2205	General and Applied Sociology	2	3/90	1+1+0	3
	HLS 2206	Human Life Safety	2	3/90	1+1+0	3
	ESD 2207	Ecology and Sustainable Development	2	3/90	1+1+0	3
	KL 2208	Kazakhstan Law	2	3/90	1+1+0	3
	FE 2209	Fundamentals of Economics	2	3/90	1+1+0	3
3. Block vocational modules (116 credits)	**3.2 Basic vocational modules**		**75**	**125/3375**		
	Module 1 – Applied aspects of meteorology					
	GH 2402	General hydrology	3	5/135	2+0+1	3
	MBEP 2403	Meteorologycal basis of enviroment protection	3	5/135	2+0+1	3
	Module 3- Physic of atmoshere					
	PhCP 2414	Physics of clouds and precipitation	3	5/135	2+0+1	3
	BDM 2416	Bases of dynamic meteorology	3	5/135	2+0+1	3
6. Additional types of training	PT	Sport and Recreation	2	3/90	0+0+2	3
Semester 4						
1. State compulsory module (10 credits)	PSK 2104	Philosophy of Scientific Knowledge	2	3/90	1+1+0	4
	3.1 Natural Sciences (STEM) module		**12**	**20/540**		
3. Block vocational modules (116 credits)	ITPP 2301	Information Technologies for Professional Purposes	3	5/135	1+0+2	4
	3.2 Basic vocational modules		**75**	**125/3375**		
	Module 1 – Applied aspects of meteorology					
	PPA 2404	Pollution and protections of atmosphere	3	5/135	2+0+1	4
	Module 2 - Means and methods of measurements					
	LPWA 2408	Laboratory practical work on aerology	2	3/90	0+0+2	4
	Aer 2409	Aerology	3	5/135	2+0+1	4
	Module 3- Physic of atmoshere					
	OAE 3415	Optics, atmospheric electricity	3	5/135	2+0+1	4
	Module 4 - Synoptic meteorology					
	SM 2418	Synoptic meteorology I	3	5/135	2+0+1	4
4. Internship	4.1c	Professional internship	**12**	20/540		
	PT201	Internship Training	5	8/225		4
6. Additional types of training	PT	Sport and Recreation	**2**	3/90	0+0+2	4
Semester 5						
3. Block voca-	**3.2 Basic vocational modules**		**75**	**125/3375**		

tional modules (116 credits)	**Module 2 - Means and methods of measurements**						
	RR 3410	Radio meteorology and radar-location		3	5/135	2+0+1	5
	SM 3411	Space meteorology		3	5/135	2+0+1	5
	Module 4 - Synoptic meteorology						
	SM 3419	Synoptic meteorology II		3	5/135	2+0+1	5
	LPWSM3420	Laboratory workshop on synoptic meteorology		2	3/90	0+0+2	5
	3.3 Modules for Individual Educational Trajectories (IET)			**30**	**50/1350**		
	IET 1 - Meteorology and climatology	**IET 2 - Protection of atmospheric air**	**IET 3 - Aviation meteorology**	**30**	**50/1350**		
	Agro 3502 Agrometeorology 2+0+1	EM 3502 Environmental Monitoring 2+0+1	TDRMEFHA 3502 The documents regulating meteorological ensuring flights of HECTARES aircrafts 2+0+1	3		5	
	EM 3503 Economic meteorology 2+0+1	EP 3503 Environmental management economy 2+0+1	EM 3503 Economic meteorology 2+0+1	3		5	
Semester 6							
3. Block vocational modules (116 credits)	**Module 3- Physic of atmoshere**						
	Clim 3417	Climatology		3	5/135	2+0+1	6
	Module 5 - Methods of forecasts of hydrological processes						
	SMWF 3421	Short-term meteorological weather forecasts		3	5/135	2+0+1	6
	AM 3422	Aviation meteorology		3	5/135	2+0+1	6
	GSM3423	Geoinformation systems in meteorology		3	5/135	2+0+1	6
	3.3 Modules for Individual Educational Trajectories (IET)			**30**	**50/1350**		
	IET 1 - Meteorology and climatology	**IET 2 - Protection of atmospheric air**	**IET 3 - Aviation meteorology**	**30**		**50/1350**	
	MMB 3504 Management and marketing bases 1+0+1	MMB 3504 Management and marketing bases 1+0+1	MMB 3504 Management and marketing bases 1+0+1	2		6	

	MCPM 4510 Methods of climatic processing of meteoinformation 2+0+1	ER 4510 Ecological right 2+0+1	MEF 4510 Meteorological ensuring flights 2+0+1	3		6	
4. Internship	4.1c	Professional internship		**12**			
	PT301	Internship Training					6
Semester 7							
3. Block vocational modules (116 credits)	**Module 5 – Weather forecast methods**						
	LTMF 4312	Long-term meteorological forecasts		3	5/135	2+0+1	7
	3.3 Modules for Individual Educational Trajectories (IET)			**30**	**50/1350**		
	IET 1 - Meteorology and climatology	**IET 2 - Protection of atmospheric air**	**IET 3 - Aviation meteorology**	**30**			
	RSM 4505 Regional synoptic meteorology 2+0+1	RSM 4505 Regional synoptic meteorology 2+0+1	RSM 4505 Regional synoptic meteorology 2+0+1	3		7	
	CK 4506 Climate Kazakhstan 2+0+1	EA 4506 Environmental assessment 2+0+1	CK 4506 Climate Kazakhstan 2+0+1	3		7	
	AC 4507 Applied climatology 2+0+1	EDRM 4507 Ecological dangers and risks in meteorology 2+0+1	OMMSA4507 Operation of meteorological means of supervision in airfields 2+0+1	3		7	
	SMWF 4508 Special methods of a weather forecast 2+0+1	CBPA 4508 Cross-border pollution of the atmosphere 2+0+1	IMPSFA 4509 Influence of the meteorological phenomena on safety of flights of aircrafts 2+0+1	3		7	
	DRM4509 Dangers and risks in meteorology 2+0+1	ED 4509 Ecological design 2+0+1	PWRMI 4509 Processing and ways of representation of a meteorological iformation 2+0+1	3		7	

	CBPA 4511 Cross-border pollution of the atmosphere 2+0+1	IE 4511 Industrial ecology 2+0+1	TIDRMS 4511 The international documents regulating meteorological support 2+0+1	3		7	
Semester 8							
4. Internship	4.1c	Professional internship		**12**			
	PT401	Internship Training					8
5. Final Certification	PPBD	Preparation and Presentation of Bachelor's Dissertation (Diploma Project)		2	3/90		8
TOTAL				**152**			

For the degree programme MSca Meteorology, the self-assessment report states the following **intended learning outcomes**:

Knowledge

1. Knowledge of skills of conditions of formation of fields of temperature in a stratosphere.
2. Identification and assessment of the extreme natural phenomena in the conditions of modern climate changes;
3. Questions of an economic assessment of resources and complex economic assessment of nature protection actions, managements of nature protection activity are considered.
4. The methodical bases, allowing to estimate an ecological situation in the world and influence of the enterprise on environment are studied; characteristics of resources of a planet and separately taken state (on the example of Kazakhstan).
5. Detailed consideration of the principles of the analysis and development of GIS on the basis of the general theory of systems

Understanding

1. Understanding of winter and summer circulation in a stratosphere, intensity of circulation.
2. Understand knowledge of results of action of cross-border transfer on climate change.
3. Possession of information technologies for the solution of problems of climatology, the analysis and a weather forecast and other meteorological directions
4. Studying of opportunities of creation of GIS on the basis of close integration with expert systems.
5. Understanding of the main processes in the Northern hemisphere connected with the barichesky centers

Application

1. Application of processes of cycle-and anti-cyclogenesis in the analysis of processes of the Northern hemisphere
2. Classification of atmospheric movements. Orders of the main meteorological sizes and their derivatives. Friedman-Gesselberga table.
3. Ability to understand bases of fundamental and special meteorological sciences, to develop concepts on the received volume of information and to define techniques of its processing;
4. Practical application of the ArcGIS and MapInfo tools, allowing to realize, debug and start all types of the studied algorithms in internship.
5. Knowledge of methods of the organization, planning and implementation of scientific researches in meteorology

Analysis

1. To plan changes for improvement of modern control systems by ecological safety;
2. To build strategy of decision-making and permission of environmental problems;
3. Knowledge of climatic changes and exhaustion of a stratospheric ozone layer;

4. Analysis of research meteorological information. Analysis and synthesis combination in meteorological sciences
5. Studying of movements in the atmosphere and the related distributions of pressure, density, temperature and humidity of air;

Synthesis

1. To own techniques of definition of optimum conditions of a sustainable development of eco-economic systems;
2. Ability to give lectures and to give practical and seminar training in the chosen direction
3. Assessment of available water stocks convective overcast of northern Kazakhstan in climatic aspect
4. Generalization, synthesis of research meteorological information, forming of the new scientific facts
5. Assessment of risk, ecological and social and economic consequences of influence of climate changes;

Evaluation

1. Calculation and assessment of the importance of the correlation relation.
2. Calculation of the operator of Hamilton; operator Laplace; operator Jacobi
3. Check of a hypothesis of a normality
4. Effectively to use knowledge of standard and legal base in the field of environmental protection for ensuring ecological safety of the enterprise;
5. Design of scenarios of implementation of research projects

The following **curriculum** is presented:

Title of module	Code of discipline	Title of subjects (modules) and type of activity	Number of credits	ECTS/ hours	L/P/L	Sem.
Semester 1						
Compulsory State Module	IFN 5201	History and Philosophy of Science	2	3/90	*1+1+0*	1
	Iya(p)5202	Foreign language (Professional)	2	3/90	*1+1+0*	1
Compulsory Professional Module	GMA 5205	Global monitoring of an atmosphere	2	3/90	*1+1+0*	1
	OPNI 5206	Organization and Planning of Scientific Research	3	5/135	*2+1+0*	1
	GRPM 5207	Global and regional problems of meteorology	3	5/135	*2+1+0*	1
	OOCADPP 5208	Features of general circulation of an atmosphere and long-	3	5/135	*2+1+0*	1

		term weather forecasts				
Master's Research Work and Fullfilment of Dissertation	NIRM I	Research Seminar I	1	2/45	1	1
Professional Practice	IP	Research practice	3	5/135	3	1
Semester 2						
Compulsory State Module	Ped 5203	Pedagogics	2	3/90	*1+1+0*	2
	Psy 5204	Psychology	2	3/90	*1+1+0*	2
Compulsory Professional Module	SSMM 5209	Modern statistical methods in meteorology	3	5/135	*1+1+0*	2
Module of Individual Educational Path	EPK 5301	Ecological problems of Kazakhstan	2	3/90	1+1+0	2
	PSB 5302	The forecast of acts of nature	2	3/90	1+1+0	2
	GKEI 5303	Global climate and its changes	2	3/90	1+1+0	2
	FVSA 5304	Physics of the Upper Atmosphere	2	3/90	1+1+0	2
Master's Research Work and Fulfillment of Dissertation	NIRM II	Research Seminar II	1	2/45	1	2
Semester 3						
Module of Individual Educational Path	SCASP 6305	Structure low - and highgeneses in Northern hemisphere	3	5/135	2+1+0	3
	MGSM 6306	Modeling of geoinformation systems in meteorology	3	5/135	2+1+0	3
	SGD(T)M 6307	The special chapters of dynamic (theoretical) meteorology	3	5/135	2+1+0	3
	SChMPP 6308	Modern numerical methods of weather forecast	3	5/135	2+1+0	3

Master's Reseach Work and Fullfilment of Dissertation	NIRM II	Research Seminar III	1	2/45	1	3
Professional Practice	PP	Pedagogical Practice	3	5/135	3	3
Semester 4						
Professional Practice	IP	Research practice	3	5/135	3	4
Master's Reseach Work and Fullfilment of Dissertation	NIRM IV	Research Seminar IV	4	7/180	4	4
Final Attesta-tion	KE	Complex Examination	1	2/45	4	4
	ZD	Dissertation Fullfilment and Defence	3	5/135	4	3

C Peer Report for the ASIIN Seal[3]

1. Formal Specifications

Criterion 1 Formal Specifications

Evidence:

- Self-Evaluation-Report
- Auxiliary document: “University-wide Academic Policies and Procedures of al-Farabi Kazakh National University”

Preliminary assessment and analysis of the peers:
The formal specifications of the programmes are defined in the Self Evaluation Report as presented in the table ahead. The audit team confirms that the names chosen reflect the respective programme-contents. The master´s programmes are consecutive programmes with a preceding bachelor´s degree. The duration of studies is in line with the Kazakh state requirements. This means the bachelor´s programmes lasting four years, in which around 150 Kazakh credits (reported to correspond with around 250 ECTS) are achieved and the master´s programmes lasting two years with overall 59 Kazakh credits (reported to correspond with around 98 ECTS). There is an uncertainty in the conversion between the Kazakh and the ECTS credit system, which is explained in chapter 3.2.

The expected intake of the programmes depends on the state grants the Kazakh Ministry for Education and Science allocates annually. It is therefore difficult to anticipate the expected intake of the programmes. Additionally, students can enroll on a self-paid basis with the fees measured at a comparable level like the state grants. Discounts for supporting special social situations are available, too.

Concerning the remaining formal attributes of the programmes (degree awarded, intake rhythm), the audit team considers the formal specifications of the programmes to be adequately defined. This information is published on the websites of al-Farabi Kazakh National University and in its “Academic Policy” (which is also available on the websites of the university).

[3] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 1:

Because the university did not give a comment about this criterion the peers confirmed their former assessment.

2. Degree programme: Concept & Implementation

Criterion 2.1 Objectives of the degree programme

Evidence:

- Discussions with the responsible members of university management
- Discussions with staff responsible for managing the study programmes
- Defined programme objectives and learning outcomes in the Self-Evaluation-Report

Preliminary assessment and analysis of the peers:

The discussion between the audit team and responsible staff from the university- and programme-management shows that the programmes covered by this report are carried out as “specialities” according to the Kazakh governmental education plan. Compulsory and vocational parts of these specialities are defined by the Ministry of Education and Science for all programmes in Kazakhstan, benchmarking them with programmes from other renowned international universities and taking into account specific Kazakh labour market needs. The autonomy of the Faculty for Geography and Environmental Sciences in programme development is thus limited to the elective courses, which can be chosen by students as individual trajectories. Those electives are reported to be revised each year.

The learning outcomes of the bachelor´s programmes can be considered as equivalent to level 6 of the European Qualifications Framework and the learning outcomes of the master´s programmes equivalent to level 7. With regards to the programme objectives – in particular at master´s and PhD level, the member of the university´s management explains the ongoing transformation process of al-Farabi University into a research-oriented university. Al-Farabi University is reported to be working close with the Kazakh Ministry of Education and Science to establish a wider range of autonomy required for a self-directed transformation. Research orientation should also find its counterpart in the educational process – especially in the trajectories at master´s and PhD level.

Although al-Farabi University does not consider itself to be on the end of its way, significant achievements are visible in the enhancement of the university´s rank in the QS World University Rankings (presently <300).

Criterion 2.2 Learning Outcomes of the Programmes

Evidence:

- Discussions with the responsible members of university management
- Discussions with staff responsible for managing the study programmes
- Defined programme objectives and learning outcomes in the Self-Evaluation-Report
- Module handbook

Preliminary assessment and analysis of the peers:
In general, the bachelor´s programmes are more professionally oriented whereas the master´s programmes orient student activities to scientific research (including publication requirements). The learning outcomes of all programmes emphasize the importance of socially developed and patriotic graduates, speaking several languages. This latter issue is especially emphasized by the member of the university´s management. In the curricula of the programmes, these goals are covered by "State Compulsory Modules" and in the bachelor´s programmes by "Social and Communicative Modules". The subject-specific definition of learning outcomes for every programme distinguishes between *knowledge*, *understanding*, *application*, *analysis*, *synthesis* and *evaluation*.

The following sets of subject specific criteria are relevant for the accreditation of the respective programmes: For the Geodesy and Cartography, Cadastre and Land Management programmes the *ASIIN Subject Specific Criteria for Civil Engineering and Geodetic Engineering (SSC 03)* are applied (for the ASIIN Seal). For the Geodesy and Cartography programmes, the university indicated an additional need to apply the engineering-related EUR-ACE-criteria as well *(EUR-ACE)*. For the bachelor´s and master´s programme in Meteorology, the relevant criteria for the ASIIN system seal are the *ASIIN Subject Specific Criteria for Geosciences in a broader sense (SSC 11)*. The two sets of criteria and the learning outcomes of the programmes correspond as follows:

Both the B.Sc. Cadastre and the B.Sc. Land Management are professionally oriented programmes, focusing their defined learning outcomes on the professional role. For the Cadastre programme this means to *maintain the State Land Cadastre including cadastral surveying, agreements with land owners on boundary positions, the production of a cadastral and land information system, the derivation of cadastral maps, using state of the*

art technology and standards; in order to the timely provision of public authorities, enterprises, organizations, institutions and individuals with reliable information on land ownership, land value, and land use; providing accounting, management and protection of land; protecting of the rights of landowners, land users, tenants; creating a basis for the standard price of land, land tax and rent; preserving of historic land ownership boundaries, sites of historical and cultural heritage. The programme in Land Management educates graduates to *conduct services in land management and real estate, land use organization of the territory, forecasting, planning and design of land use, management and protection of the land, as well as on the organization of the territory.*

The defined competences with regards to *(engineering) analysis* (SSC 03) in the Cadastre programme focus on finding solutions in conflicting data and field situations regarding the correctness of parcel boundaries and on *information about single objects´ properties for the development of management decisions and on analysis of the results of environmental and economic assessment programmes for schemes and projects of social and economic development of areas*. In case of the Land Management programme, analytical competences are related to *options for land use planning schemes and land management projects, their effect on the rational and efficient use of land; the formation of land tenure and use of agricultural enterprises and farms*.

With regards to *(engineering) design* (SSC 03), the Cadastre programme focuses on *drafting cadastral surveying plans and land management schemes and urban planning, land use planning, forming active policies in the field of land and property relations, designing and constituting crop rotation schemes, plans for their development, evaluating them in an agronomic perspective*. The Land Management programme enables graduates e.g. to conduct *feasibility studies to establish the boundaries of land use* and to *scheme design techniques and the use of land resources, land management schemes and other pre-and forward-looking materials*.

Concerning *investigations and assessment* (SSC 03), the Cadastre programme enables graduates to evaluate e.g. the *properties and characteristics of the land as an object of cadastral registration* as well as the *order and procedures for the conduct of land registration and land records*. For the Land Management programme evaluative competences are related to the *conditions and use of land resources, predicting the consequences of design-decisions on land management; projects of spatial planning and peasant agricultural enterprises (farms); models of land management for describing and predicting the use of land and other property; the economic arrangement of the territory of settlements*. In the context of the professional objectives of both programmes, this is seen as adequate to the SSC´s *typical survey tasks and GIS requirements*. The *engineering practice* (SSC), although incorporated in both programmes in form of the *permanent internship*, should be

described more explicitly in the module descriptions, as mentioned in chapter 2.3. This is just a matter of comprehensiveness, because substantial and ambitious professional work becomes visible especially in the final theses.

For the B.Sc. Geodesy and Cartography the required *knowledge and understanding in mathematical and scientific areas relevant to the subject,* as required by the SSCs and the EUR-ACE-criteria, is addressed in the defined outcomes of the programme (e.g. "understanding of physical principles of modern technical devices", "understanding of mathematics as a special way of understanding the world, its common concepts and ideas"). The peers are convinced that these outcomes have to be highlighted, because in their adequacy they have to catch up with the requirements of the SCCs 03. How these outcomes ought to be achieved, is explained in chapter 2.6. In view of the audit team, profound knowledge of fundamentals is a prerequisite for adequate, future oriented practical work. The peers take into account that the faculty reports to cover some of the requested mathematical and physical content in the specific vocational modules (e.g. "Theory of Mathematical Processing of Geodetic Measurements"). Nevertheless, aligned with the mentioned perception, the audit team indeed recognizes substantial and ambitious *professional* work in the final theses, which is absolutely perfect for the bachelor´s level – but misses some topics oriented to independent fundamental research at master´s level.

At master´s level for the M.Sc. Geodesy and the M.Sc. Cartography, *knowledge and understanding* is not addressed by the defined learning outcomes of both programmes. In view of the peers, the perceived lack of intensity in the fundamental education with regards to *mathematical*, *physical* and *computer science oriented* competences becomes more evident. An elevated level would be required for a transition from a descriptive to an analytical science, claiming to challenge unspecified problems in research as required by the SSC 03 and the EUR-ACE criteria. In the discussions on the onsite-visit, the audit team had the impression that faculty staff shares this impression to a certain degree and that some conditions do not encourage staff actually engaged in the programmes to initiate a further development in this direction. In the overall impression of the audit team, this problem is perceived to be solvable.

With regards to *engineering design* as mentioned in the EUR-ACE criteria, the original products of the respective disciplines in Geodesy and Cartography consist of mapping and imaging products, which are e.g. the foundation for construction work and monitoring. In the description it becomes clear that students at bachelor´s level are introduced to methods like *digital mapping* and *three-dimensional modeling*, whereas student´s at master´s level focus more on the *automation of measurements* as well as an *automation of mapping and modeling techniques*. In perception of the audit team, this is sufficient to fulfill the respective EUR-ACE-criteria.

With regards to *engineering analysis* (SCC 03) as well as to *investigations and assessment*, the B.Sc. Geodesy and Cartography enables graduates e.g. to *execute and process topographic and geodetic measurements*, to *interpret remote sensing data* etc. These analytical competences are addressed in the *vocational modules*. They are perceived to be equivalent to the competences the SCC 03 mention under the topic of *thorough knowledge of subject-specific fundamentals* as well as to the EUR-ACE criteria for engineering analysis.

For both the M.Sc. in Geodesy and in Cartography it is difficult for the audit team to identify the elevated academic level just with the definition of the programmes´ learning outcomes at hand, because these outcomes cannot be distinguished from the bachelor´s level. As mentioned before, the *engineering practice* (SCC), although incorporated in all three programmes in form of the *permanent internship* and becoming visible in substantial professional work in the final theses, should be described more explicitly.

The level of *knowledge and understanding* of the fundamental principles of the scientific field provided by the B.Sc. programme in Meteorology is seen as adequate like the overall concept of the study programme. The required *knowledge and understanding* of the physical and chemical processes proceeding in the atmosphere and hydrosphere as required by the SCCs 11 is addressed in the defined outcomes of the programme. For the bachelor´s level, this is perceived to be adequate and equivalent to the SCCs. The learning outcomes of the Master´s programme in Meteorology are perceived to be likewise adequately defined and equivalent to the respective SCCs. They are clearly distinguished from the bachelor´s level. Nevertheless, a deficiency is seen with regards to the need for deepened competences in *higher mathematics* and *higher physics*. These competences become more urgent in the framework of the research oriented objectives at master´s level. This perception is confirmed by the final theses at master´s level, which in fact document research oriented topics, but which could also demonstrate a broader scope of research topics. This is seen as a direct consequence of a limited range of research equipment (mentioned in chapter 5.3).

In summary, the audit team perceives the master´s level to be acceptable under a professional perspective. In context of the overall transition of al-Farabi University to a research university and its master´s studies leading to PhD-programmes, the master´s curricula in all three programmes should be sharpened consequently towards a focus in independent international research.

Criterion 2.3 Learning outcomes of the modules/module objectives

Evidence:

- Module Handbook
- Objectives Matrix

Preliminary assessment and analysis of the peers:

The module descriptions clearly distinguish between knowledge, skills and competences to achieve and overall provide adequate descriptions in these terms. The descriptions are accessible in the UNIVER-system and students were perceived to be informed about them. For every programme, a meaningful objectives matrix is presented – showing the correspondence between defined objectives and learning outcomes at programme level and modules leading towards them.

There are some drawbacks concerning the module descriptions. The description of the STEM-modules is missing for the bachelor programme in Geodesy and Cartography, although it is mentioned in the study plan. Practical training, although integrated into the subject specific modules and the respective student workload credited, should be described in terms of tasks to perform and competences to achieve. Furthermore, a module description for the final thesis, amongst others explaining the overall students´ workload, is missing.

With regards to required language competences in the international scientific community, the member of the university management explains the trilateral language policy of al-Farabi University. In the module descriptions, several languages are mentioned (Russian, Kazakh and English). The discussion reveals that students are free to choose. Against the background of the objectives of al-Farabi University as well as the international sphere of science in general, the audit team necessarily promotes English as an international scientific language. In the discussion with students, the audit team came to the impression that command of English as an academic language was more than visible. At present, this is obviously not utilized on the level of modules and courses on a compulsory basis. The audit team would therefore appreciate more compulsory English-language-based subject specific module parts to strengthen the respective competences. This is necessary e.g. to prevail on international conferences.

Overall, with exception of the minor aspects mentioned, the audit team considers the respective criteria to be adequately fulfilled.

Criterion 2.4 Job market perspectives and practical relevance

Evidence:

- Overview of companies and institutes in the Self-Evaluation-Report
- Discussion with responsible staff for the study programmes

Preliminary assessment and analysis of the peers:

Because of the programmes aligned to labour market needs by state regulation, there is no doubt for the peers concerning their practical relevance and the job market perspectives of their graduates. Overall, the faculty reports to have 90% of its graduates placed in employment – mostly in governmental agencies. The member from the university´s management explains that every faculty of al-Farabi University has its own council of employers interested in those specialities. A list of employers is presented in the Self-Evaluation-Report. Furthermore the audit team had the possibility to visit institutes employing graduates from some of the respective study-programmes.

Over the whole course of studies in the bachelor´s programmes, the faculty is following the concept of a permanent internship, taking place every semester either as practical training or as a professional internship in companies/non-university institutes (in the 6th and 8th semester of the bachelor´s programmes).

The audit team perceives an alignment with job market perspectives in Kazakhstan.

Criterion 2.5 Admissions and entry requirements

Evidence:

- Discussion with responsible staff for the study programmes
- Auxiliary document: “University-wide Academic Policies and Procedures of al-Farabi Kazakh National University”

Preliminary assessment and analysis of the peers:

The admission to the bachelor´s degree programmes depends to a vast extent on state grants provided by the Kazakh government. They are distributed to students on a competitive basis. Students have to pass the Unified National Test (covering competences in *maths, natural sciences, languages, history*) and – in case of successful competition – are awarded with a state grant for a specific programme, covering study fees and to some extend the costs for accommodation and subsistence. The ratio of self paying students in the faculty is low, like the statistics in the Self Evaluation Report depict. International students can apply for the Higher Education Institutes in Kazakhstan as well by taking a stan-

dardized test (for bachelor´s programmes) and university entrance exams. Parts of these university entrance exams require a command of Kazakh language.

Admission to the master´s degree programmes is also defined by the Ministry of Education and Science of Kazakhstan. The testing system for the distribution of state grants works similar to the bachelor´s level. Educational grants for master's degree programmes are awarded to students on a competitive basis. Candidates for the master´s programmes have to take entrance exams which comprise a standardized test of foreign language command and written exams for the specific subject conducted by the al-Farabi University´s Admission Commission. Altogether only around 10% of students pass into the second cycle by state grants. The vast majority of bachelor students find employment on the job market.

Although the audit team does not appreciate the standardized approach towards the admission of bachelor´s students, the peers understand it´s function in the overall context of financing studies. They appreciate the approach at master´s level, because they perceive it to belong to the autonomy of al-Farabi-University. Overall they confirm the admission requirements and procedures to meet the criteria.

Criterion 2.6 Curriculum/Content

Evidence:

- Curriculum overview in the Self-Evaluation-Report
- Objectives matrix in the Self-Evaluation-Report

Preliminary assessment and analysis of the peers:
The equivalence between the defined learning outcomes at programme-level and the relevant subject-specific criteria has been described in chapter 2.2. The coherence between the programme outcomes and the respective modules leading to them is subject to the present chapter. The faculty has presented objectives matrixes for every programme, showing the correspondence between learning outcomes and the modules where they are achieved. Unintended overlaps in module contents and their provision are prevented by educational planning on a central level of the faculty.

The fundamental scientific *knowledge and understanding* (SSC 03) of the basic principles of the subject, although not highlighted in the defined learning outcomes of the Cadastral and Land Management programmes, are subject to the STEM-Modules. The STEM-modules (stands for *Science, Technology, Engineering, Mathematics*) is meant to cover the engineering-related basics to an extent comparable to around 20 ECTS devoted to the achievement of *competences in mathematics* and *information processing (with a focus on computer graphics and the principles of automated land survey and cadastral systems,*

SALCD). Each programme contains the *principles of the professional field of cadastre/land management* including the respective *legal frameworks*. For the professionally oriented objectives of both programmes, the respective module is considered to be adequate and equivalent to the SSC 03.

In the Cadastre and Land Management programmes, the competences in *engineering analysis* (SCC 03) are addressed by the basic professional modules (e.g. *Photogrammetry, Basics of remote sensing, Basics of environmental monitoring, GIS in land management and management of land surveying works)* and are seen as equivalent to the "deepened and expanded subject specific skills" stated in the SSCs. The required competences in *engineering design* are addressed in the basic professional modules of the Cadastre programme (e.g. "Basics of engineering arrangement, land assessment and geodesic works in the cadastre") and for the Land Management programme in modules like "Land use planning and geodesic works in land management". They are perceived to be equivalent to the *applied skills* stated in the SSCs. Concerning *investigations and assessment*, the Cadastre programme contains modules subjected to "Economics of real estate and evaluation of land with the basics of taxation". For the Land Management programme, these competences are subject e.g. to the module "Intrafarm land management and planning of settlements").

Concerning the international competitiveness of the programme, the peers recommend to integrate international cadastre concepts and standards into the curriculum, especially the UN ECE Land Administration Guidelines and follow-up concepts of the Working Party on Land Administration (WPLA), the ISO TC 2011 standards, especially the Land Administration Domain Model (LADM), and Cadastre 2014 of FIG.

In the B.Sc. Geodesy and Cartography, the outcomes in terms of *knowledge and understanding in mathematical and scientific areas relevant to the subject* are reported to be achieved by the STEM-modules (*Science, Technology, Engineering, Mathematics*). Unfortunately, the respective module description is missing. From the study plan it becomes evident that STEM contains the modules "Geoinformatics", "Mathematics in Geodesy and Cartography", "Space Physics", "Physical Bases of Opto-Electronic Devices" with an amount equaling 5 credit points ECTS each. The peers expect the module in particular for mathematics to be similar to the respective module in the Cadastre and Land Management programme. Although its description addresses adequate mathematical topics (e.g. *vector and linear algebra, analytic geometry, differential equations, statistics*) as well as in physics, the audit team doubts that the "profound knowledge" the SSC 03 require for an engineering degree –in specific terms the competence to understand and solve geometry-related problems – can be achieved in such a short amount of time without any draw-

backs compared to the standard of European programmes. These studies should be intensified before these programmes can be addressed as engineering.

With regards to *engineering analysis* as well as competences in *investigation and assessment*, the audit team recognizes the elevated master´s level in the descriptions of the compulsory professional modules, which address deepened theoretical and methodological competences (e.g. Geodesy: "Geodetic Researches of Dynamics of Geomorphological Processes", Cartography: "Problems of the theory and methodology of modern cartography"), and in the individual educational paths, which are more focused on research oriented topics (e.g. Cartography: "Cartographic Research Methods", "Automation in Mapping and Modeling", Geodesy: "Automation of Geodetic Measurements"). These topics are supported by generic modules on e.g. the "Organization and Planning of Scientific Research" and "Research Seminars" supporting the final thesis. As mentioned before, the *engineering practice* (SCC), although incorporated in all three programmes in form of the *permanent internship* and becoming visible in substantial professional work in the final theses, should be described more explicitly in the module descriptions, as mentioned in chapter 2.3.

In the B.Sc. Meteorology, the level of *knowledge and understanding* of the fundamental principles of the scientific field is reported to be achieved in the STEM-modules (*Science, Technology, Engineering, Mathematics*). In the module descriptions it is explained that STEM contains the modules "Higher Mathematics", "Physics", "Information Technologies for Professional Purposes", "Chemistry of the Atmosphere" with an amount equaling 5 credit points ECTS each. The module descriptions address competences in physics, chemistry and mathematics (e.g. understanding and application of *vector and linear algebra, analytic geometry, differential equations, statistics*). Some competences are subject to modules in the later course of studies at master´s level (*Navie-Stokes-equations* are e.g. subject of the module: "The special chapters of dynamic (theoretical) meteorology, Modern numerical methods of weather forecast"). As mentioned in 2.2, a deficiency is seen with regards to the need for deepened competences in *higher mathematics* and *higher physics*. These competences become more urgent in the framework of the research oriented objectives at master´s level.

In summary, the audit team detected weaknesses concerning the fundamental education with regards to mathematical and physical competences in the Geodesy and Cartography as well as in the M.Sc. Meteorology-programme. Overall, the curricula are perceived to be somewhat overregulated. The peers take into account that the respective autonomy of the faculty is limited. They strongly support any efforts to enhance the proportion of responsibility of faculty staff for the definition of curricula in general as well as any efforts to enhance flexibility in the design of curricula in particular.

With the restrictions mentioned, the audit team confirms that the modules lead to the defined outcomes of the programmes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 2:

Because the university did not give a comment about this criterion the peers confirmed their former assessment. Additionally they asked the university to add a module description of the final thesis for all programmes.

3. Degree Programme: Structures, Methods & Implementation

Criterion 3.1 Structure and modularity

Evidence:

- Curriculum overview in the Self-Evaluation-Report
- Module Handbook

Preliminary assessment and analysis of the peers:
The faculty delivered module descriptions in the Self-Evaluation-Report. These module descriptions are reported to be published annually (in the university´s "UNIVER"-System) to enable students to choose an individual trajectory of studies (in the area of electives). Students also report getting a student "guidebook" at the entrance of the first year.

Modules at bachelor´s level are clearly distinguished from modules at master´s level. One module usually contains several types of courses (lectures, seminars, practical training) and the description also takes into account times for unguided and guided self-studies. For the latter, teaching staff is available on request. As far as the audit team can see, every component of the programme is covered by a module description - with the following exceptions: The description of the final thesis for every programme is missing. The internships and laboratory practice, although mentioned in the module descriptions, should be described more explicitly in terms of tasks to perform and competences to achieve. In particular for the Geodesy and Cartography-related programmes, this is necessary to identify the extent of competences closely related to engineering design and engineering practice.

Concerning international mobility the al-Farabi University participates in academic exchange programmes and since 1993, Kazakhstan has introduced the "Bolashak"-programme to foster academic mobility. The Faculty of Geography and Environmental

Sciences has several partnerships with universities abroad (e.g. *University of Salzburg, University of Amsterdam, Prague Development Center*). Students usually do not have to pay fees for their time abroad. The discussion with students was attended by several students who made positive experiences with studying abroad. Recognition procedures are in place.

Before the background of the university´s objectives in becoming a research oriented university, the peers recommend to actively pursue and broaden the internationalization policy in general and academic mobility in particular. With the constraints mentioned, they consider the criteria to be fulfilled.

Criterion 3.2 Workload and credit points

Evidence:

- Auxiliary document: "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University"
- Module Handbook
- Discussions with students

Preliminary assessment and analysis of the peers:
As far as the peers can see, every compulsory part of the programmes is credited (including the internships), differentiating student workload in time for courses as well as guided and unguided self studies. The average workload in the bachelor´s programmes usually exceeds thirty ECTS-credits. In the master´s programmes this is expected to be similar, but there is an uncertainty in the calculation of ECTS. Concerning the comparison between both credit systems the peers do not understand the calculation at master´s level. The "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University" state that one credit in the master´s programmes is equal to 60 hours of student workload. In this calculation, the master´s programmes should sum up to around 131 ECTS although 98 ECTS are stated in the Self-Evaluation-Report. The peers ask the faculty to clarify this because it is not understandable in an easy manner.

The audit team relies on the students´ feedback, considering this amount of workload to be challenging but acceptable. Furthermore the teaching staff is reported to be cooperative concerning unbalanced workload in certain courses and willing to do adjustments.

Overall, awarding of credits points seems realistic. To meet the criteria it would be required to clarify the equation between the Kazakh credits system and ECTS.

Criterion 3.3 Educational methods

Evidence:

- Discussion with teaching staff
- Module handbook

Preliminary assessment and analysis of the peers:
The module descriptions distinguish between *lectures*, *practical training* and *seminars*. Although not explicitly marked as a teaching method, it is also visible and confirmed by teaching staff that several modules in all study programmes contain *projects*, which are partly funded by the government. Furthermore new media like audio books and video lectures are applied. Resuming their overall experience, students vote for more practical training, because they perceive the theoretical content to be already exhaustive.

Each programme enables students to a certain extent to choose between elective modules in individual trajectories. The peers appreciate this rich variety of educational methods.

Overall, the criteria for the educational methods are perfectly met.

Criterion 3.4 Support and advice

Evidence:

- Auxiliary document: "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University"
- Discussions with students
- Discussions with teaching staff

Preliminary assessment and analysis of the peers:
Students report the support and advice at the faculty to be excellent. They describe their advisors as engaged, diligent, kind and open-minded. There is obviously sufficient time for supervising students. Non-subject specific counseling needs are addressed by a special counseling-infrastructure at university level (including a bologna office supporting mobility).

Overall, students made a very satisfied impression on the peers. They therefore consider the respective criteria for support and advice to be sufficiently fulfilled.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 3:

The university did not clarify the relation of Kazakh credit points to ECTS Points. To be transparent to external stakeholders the transformation of the Kazakh credit points into ECTS points must correspond to the ECTS regulation that one credit point is based on 25-30 hours student workload.

Because the university did not give a further comment about this criterion the peers confirmed the other points of their former assessments.

4. Examination: System, Concept & Implementation

Criterion 4 Exams: System, concept & implementation

Evidence:

- Auxiliary document: "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University"
- Module Handbook
- Inspection of final theses

Preliminary assessment and analysis of the peers:
The types of exams are defined in the module handbooks of the study programmes. Usually, every module exam splits into three parts: Two midterms and the final exam. As a rule, midterm exams use a more orally based methodology (class discussion, interview) but also forms of testing and problem solving. The final exam usually consists of a written exam lasting about two hours. Students also have the opportunity to vote for an orally conducted final exam. Just from the presented module descriptions alone, students do not know how the final grade is calculated. Therefore it is required to include this information in the module description.

The examination schedule is drafted on central level of the faculty to assure that there are no overlaps in exams on compulsory courses and that there are one to two days between the single exams. As far as this is concerned, nothing is indicating an interference with individual students´ progress. With regards to the achievement of module objectives, students confirm exams to be reasonably linked to the course contents and the competences they are expected to achieve. An appeal against examinations is possible within 24h after publication of the marks. It is processed by a specific commission.

Each study programme has a final thesis and the peers could inspect the topics of the mostly in Russian or Kazakh written theses, because they had a preceding English abstract. The subject of the final thesis is developed together with a supervisor from the

faculty. This relationship is fixed in the last year of studies. Students then no longer have a right to deviate from this subject until the defense of the final thesis. As mentioned in chapter 3.1, it was difficult to identify the workload scheduled for the final thesis, because a respective module description is missing. In the discussion with staff responsible for programme management, this issue could be clarified. Students are obliged to work on their final theses in several parts of the programmes respective in several modules (professionally oriented internships as well as scientific projects). Altogether, the theses sum up to 16 ECTS at bachelor´s and 22 ECTS at master´s level. This explanation was a sufficient clarification on the audit team, but nevertheless they require a respective module description to have this impression fixed.

Overall, with the constraints mentioned, the peers consider the respective criteria to be sufficiently met.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 4:

Because the university did not give a comment about this criterion the peers confirmed their former assessment.

5. Resources

Criterion 5.1 Staff involved

Evidence:

- Staff handbooks in the Self Evaluation Reports
- Discussion with members of the university management
- Discussions with teaching staff
- Discussions with students

Preliminary assessment and analysis of the peers:

In the discussion with the peers, the member of the university management resumes the yet ongoing transformation process of al-Farabi University into a research institution, after being a more educationally oriented university in former times. Concerning scientific staff, this is to be achieved by a results-based management approach, which appears in individual agreements on objectives and individual reporting, taking into account the research performance to 50%, the educational performance to 35% and to 15% the social work of teaching staff in creating a generation with a deep respect to society.

In general, the academic career stages lead from the position of a young researcher to an assistant professor to an associate professor and then to a full professorship with the latter being the only permanent position in the academic career. The appointment to titles is based on requirements set by the Ministry of Education and Science, mostly taking into account the number of publications and their impact factor. The requirements are elevated towards the next position. Staff recruitment in general is conducted by open calls (e.g. announcements in newspapers) and for new specialities, staff is partly recruited directly from companies. There is also a governmental budget available for the invitation of foreign researchers.

There are fixed ratios of students to teaching staff required by the ministry of education. Generally, the approximate ratio follows 8:1 at bachelor´s level, 4:1 at master´s level and 3:1 at PhD-level. For courses e.g. at bachelor´s level this means that a lecture group should contain about 50 students, a seminar group around 25 and 15 for a lab group.

The member from the university management confirms that the present resources for the programmes in terms of staff, equipment and budget are assured for the period of accreditation and that the development of these programmes will be supported. There is no reason for the peers to doubt this declaration.

Concerning the present teaching staff, the audit team had a good overview through the staff handbooks provided in the Self Evaluation Report. The peers approve sufficiency of teaching staff to conduct the programmes – although they would appreciate an enhanced institutional setting for sabbaticals and an enhancement of research equipment (5.2 and 5.3.). This would enrich the prospects of further academic development.

Criterion 5.2 Staff development

Evidence:

- Discussion with members from the university management
- Discussion with members from the faculty management
- Discussion with teaching staff

Preliminary assessment and analysis of the peers:
The path of the academic career was already described in the preceding chapter. Already at master´s level some pedagogical practice is integrated into the course of studies. At PhD-level it is quite usual that PhD-students hold lectures from their supervising professors to supplement their salaries. Young professors are supported by a mentoring programme and there are seminars on educational methods available where staff can obtain certificates on their pedagogical competences. Funds from research projects can be used

to a certain extent for personal development as well. Concerning the availability of sabbaticals (e.g. to improve research skills), the peers felt a need for enhancement. In principle, sabbaticals are available, but the audit team perceived them as quite short and available just occasionally. The same counts for the issue of academic mobility of staff. Against the background of the transformation objectives of al-Farabi University towards a research university, the audit team strongly recommends to enhance the respective institutional setting.

Overall, with the recommendations made, the audit team considers the opportunities to be sufficient to meet the respective criteria.

Criterion 5.3 Institutional environment, financial and physical resources

Evidence:

- Visitation of the laboratories
- Lists of equipment in the Self-Evaluation-Report

Preliminary assessment and analysis of the peers:
The self-evaluation-report provides a detailed list of the laboratory and IT-equipment available. In addition to this, the audit team had the possibility to visit the laboratories of the Faculty of Geography and Environmental Sciences. In general, the peers had a positive impression of the adequacy of equipment for the education at bachelor´s level.

With regards to the research orientation necessary in the master´s programmes, the audit team detects deficiencies unclosing room for improvement towards the development of students´ research skills and competences. The lack of equipment narrows the scope of research to topics, where empirical data is available to a certain extent. For e.g. in the case of Meteorology, this would be the – undoubtedly important and ought to be pursued – focus on research on *climate change*. In detail, the peers are missing equipment in case of Geodesy and Cartography equivalent to *terrestrial laser scanning, digital photogrammetry with corresponding software packages, gravity equipment* and in case of Meteorology equipment equivalent to *cloud LIDAR* and *radiation equipment*. These are only examples representing the level of the required equipment. The audit team strongly supports the faculty in an autonomous decision about the equipment to purchase. In view of the audit team, the confirmed options of using equipment from cooperating faculties and non-university research institutions are precious, but they do not assure that the respective learning outcomes of students are achieved.

With reference to software, teaching staff and students in the Cadastre, Land Management, Geodesy and Cartography programmes report to work e.g. with *ArcGIS*, *AutoCAD*

and *MapInfo*. Anyway, in these subjects, access to databases could be enhanced. This also counts for the *access to databases and models on climate* for the subject of Meteorology. Students in general vote for strengthening work with information technologies. The audit team supports this request and points out the necessity, not only to apply software, but to understand concepts and methods lying beneath the surface of the latter.

The financial stability and future support of the programmes was confirmed by a member of the university management (5.1). All in all, despite of the mentioned deficiencies, the physical equipment is considered to be sufficient to achieve the learning outcomes of the programmes at bachelor´s level. But for the master´s level in Geodesy, Cartography as well as for Meteorology, an enhancement of the respective equipment would be required.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 5:

Because the university did not give a comment about this criterion the peers confirmed their former assessment.

6. Quality Management: Further Development of Degree Programmes

Criterion 6.1 Quality assurance & further development

Evidence:

- Auxiliary document: “University-wide Academic Policies and Procedures of al-Farabi Kazakh National University”
- Sample of the evaluation questionnaire
- Discussion with students

Preliminary assessment and analysis of the peers:

Concerning quality assurance and further enhancement, the university reports to have implemented an ISO 9001 approach for management- and administration-oriented issues. This approach and the respective certificates are visible on the websites of the university. For quality enhancement in educational aspects, the responsibility belongs to the Methodological Bureau every faculty of al-Farabi University has appointed. This responsibility includes the discussion of teachers-based evaluation results and the enhancement and modernization of educational approaches in general (e.g. distant learning technologies) and teaching performance in particular.

One important method to collect feedback from students is focused on the quality of teaching staff. The faculty has implemented an evaluation questionnaire which focuses on teaching performance. Systematic errors (e.g. unpopular topics) are taken into account when discussing the results, as a member of the university management explains. Additionally, exams are checked by a commission to rate the teachers´ performance (this also counts for advisors). As a support for enhancement, there are didactical trainings available provided by the university. Teaching staff also reports about a university-wide competition to identify the best teacher, which is granted with a sabbatical. But unfortunately, the winner takes the only award. The audit team would really appreciate an approach with a broader-scale-effect. In view of students attending the discussions, an enhancement of teaching performance is visible, but it could be communicated closer in connection of the questionnaire´s results. Because of non-permanent contracts for a significant share of teaching staff, a bad feedback over three consecutive years can lead to not prolonging the contract. Of course, this is the last resort after conceding a defined time for improvement.

Overall, the audit team considers sufficient quality management procedures to be implemented. Concerning the teachers-based evaluation, they are not likewise convinced and recommend a more course based approach to the faculty. This would enable a specific feedback e.g. on the achievement of the defined learning outcomes of modules (in students´ view) and on the actual approximative workload spent on modules. Overall, the peers consider the respective criteria to be fulfilled.

Criterion 6.2 Instruments, methods and data

Evidence:

- Self Evaluation Report

Preliminary assessment and analysis of the peers:

The instruments for quality assurance purposes have been described in the previous chapter. In its Self-Evaluation-Reports, the faculty has presented data on staff capacity, facilities and equipment as well as on student counts, statistics about graduates for all study programmes and the ratio of self paying students. The vast majority of students studies on the basis of state grants. For the programmes in Meteorology and in Geodesy and Cartography, also the distribution of grades is presented in the Self-Evaluation-Report. What is missing in view of the peers is data on academic mobility of students as well as of teaching staff. Because of the audit team considering this issue to be of strategic importance, it would be beneficial to the faculty to add data on mobility for future development.

In general, the data presented depict the implementation of the programmes and are thus considered as useful for programme development.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:

Because the university did not give a comment about this criterion the peers confirmed their former assessment.

7. Documentation & Transparency

Criterion 7.1 Relevant Regulations

Evidence:

- Auxiliary document: "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University"

Preliminary assessment and analysis of the peers:
Most topics relevant to regulations are explained in the "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University". This document was provided in supplement to the Self-Evaluation-Report and is published on the websites of the university.[4] It contains information on admission, the academic calendar, credits points required to achieve in the respective cycles, exams and grading, the structure of the university and the Law on Education of the Republic of Kazakhstan.

The audit team considers the characteristics of the programmes to be adequately defined by this document.

Criterion 7.2 Diploma Supplement and Certificate

Evidence:

- Sample of the Transcript of records

Preliminary assessment and analysis of the peers:
At present, the al-Farabi-University has just started to provide a diploma supplement as an auxiliary document to the degree certificate and the already delivered transcript of records. With regards either to the objective of al-Farabi University to establish a conversion towards the European Higher Education Area as well as the requirements of the ASIIN seal, the peers strongly support the idea of providing a diploma supplement to the

[4] http://www.kaznu.kz/en/14614/page
27/07/2014

graduates. This document should describe the awarded qualification and the educational system of Kazakhstan – in this way fostering comprehensibility and comparability between the educational systems.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 7:

The peers noticed the added example of a diploma supplement for the geodesy programme. They marked that the seen supplement does not provide information neither about the study aims and (generic) learning objectives nor about the Kazakh educational system. They required examples of specific supplements for each programme.

D Additional Documents

Before preparing their final assessment, the panel ask that the following missing or unclear information must be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

D 1. Clarification of the conversion of Kazakh credits to ECTS

D 2. Module description of final thesis (explaining the overall workload students spend on their final theses)

D 3. Diploma Supplement (explaining the degree awarded and the Kazakh educational system)

E Comment of the Higher Education Institution

The institution did not give a statement to the report but added the following additional documents :

Diploma supplement and transcript of record for a geodesy programme

F Summary: Peer recommendations (14.09.2014)

Taking into account the additional information and the comments given by the university the peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	**ASIIN seal**	**Subject-specific Label**	**Maximum duration of accreditation**
B.Sc. Cadastre	With requirements for one year	n.a.	30.09.2019

Degree Programme	ASIIN seal	Subject-specific Label	Maximum duration of accreditation
B.Sc. Land Management	With requirements for one year	n.a.	30.09.2019
B.Sc. Geodesy and Cartography	With requirements for one year	EUR-ACE® with requirements	30.09.2019
M.Sc. Geodesy	With requirements for one year	EUR-ACE® with requirements	30.09.2019
M.Sc. Cartography	With requirements for one year	EUR-ACE® with requirements	30.09.2019
B.Sc. Meteorology	With requirements for one year	n.a.	30.09.2019
M.Sc. Meteorology	With requirements for one year	n.a.	30.09.2019

Requirements

For all degree programmes

A 1. (ASIIN 2.3) The module descriptions have to be enhanced as stated in the report (description of practical tasks in laboratory practice and internships/calculation of grades at module level). There have to be module descriptions for all parts of the programmes (missing module descriptions).

A 2. (ASIIN 5.3) The laboratory equipment has to be enhanced to enable the departments to broaden their research performance as a basis for a research-based teaching in the master´s programmes. The equipment mentioned in the report is meant as an example for an equivalent level. The final decision about the choice of new equipment should belong to the faculty.

A 3. (ASIIN 3.2) The transformation of the Kazakh credit points into ECTS points must correspond to the ECTS regulation that one credit point bases on 25-30 hours student workload.

A 4. (ASIIN 7.2) An English diploma supplement has to be provided as a separate document, specifying the qualification achieved.

For the B.Sc. Geodesy and Cartography programme

A 5. (ASIIN 2.6) A concept has to be provided, how the fundamental education in mathematics, physics and computer science closely related to engineering education is going to be enhanced as described in this report.

For the M.Sc. Geodesy and M.Sc. Cartography programmes

A 6. (ASIIN 2.2, EUR-ACE) A concept has to be provided, how research orientation and compliance to international standards in Geodesy and Cartography are going to be enhanced as indicated by this report. This concept has to refer to laboratory equipment, staff development, international cooperation and the defined learning outcomes of the programmes.

For the M.Sc. Meteorology programme

A 7. (ASIIN 2.2) A concept has to be provided, how research orientation and compliance to international standards in Meteorology are going to be enhanced as indicated by this report. This concept has to refer to laboratory equipment, staff development, international cooperation and the defined learning outcomes of the programme.

Recommendations

For all degree programmes

E1. (ASIIN 2.6) A greater proportion of responsibility should be given to academic staff to define the programme in consultation with the ministry.

E2. (ASIIN 5.2) The options of staff for taking sabbaticals should be enhanced to pursue the transition to a research oriented university.

E3. (ASIIN 3.1, 5.2) International mobility in the programmes should be enhanced to achieve a higher level of international academic experience. This counts for staff as for students as well. Data on mobility should be integrated into the management information the faculty is relying on.

E4. (ASIIN 2.3) The English-language policy should be actively pursued. This includes more subject specific modules taught in English.

For the bachelor´s programmes in cadastre and land management

E5. It is recommended to integrate international cadastre concepts and standards into the curriculum, especially the UN ECE Land Administration Guidelines and follow-up concepts of the Working Party on Land Administration (WPLA), the ISO TC 2011

standards, especially the Land Administration Domain Model (LADM), and Cadastre 2014 of FIG.

G Comment of the Technical Committees (15./16.09.2014)

Technical Committee 03 – Civil Engineering, Geodesy, Architecture (15.09.2014)

Assessment and analysis for the award of the ASIIN label:

The Technical Committee discusses the report and follows the assessment of the peers without any changes.

Assessment and analysis for the award of the EUR-ACE® Label:

The Technical Committee deems that the intended learning outcomes of the bachelor's degree programme Geodesy and Cartography and of the master's degree programmes Geodesy and Cartography do comply with the engineering specific part of Subject-Specific Criteria of the Technical Committee Mechanical Engineering.

The Technical Committee 03 – Civil Engineering, Surveying and Architecture recommends the award of the seals as follows:

Degree Programme	ASIIN seal	Subject-specific Label	Maximum duration of accreditation
B.Sc. Cadastre	With requirements for one year	n.a.	30.09.2019
B.Sc. Land Management	With requirements for one year	n.a.	30.09.2019
B.Sc. Geodesy and Cartography	With requirements for one year	EUR-ACE® with requirements	30.09.2019

M.Sc. Geodesy	With requirements for one year	EUR-ACE® with requirements	30.09.2019
M.Sc. Cartography	With requirements for one year	EUR-ACE® with requirements	30.09.2019
B.Sc. Meteorology	With requirements for one year	n.a.	30.09.2019
M.Sc. Meteorology	With requirements for one year	n.a.	30.09.2019

Technical Committee 11 – Geosciences (16.09.2014)

Assessment and analysis for the award of the ASIIN label:

The Technical Committee discusses the report and propose to cancel the last sentence of the requirement 2 about the decision of new equipment because this would be to extensive exertion of influence in the structure of the university. Additionally it propose a new formulation of the recommendation 2 to clarify the mentioned issue.

Assessment and analysis for the award of the EUR-ACE® Label:

The Technical Committee deems that the intended learning outcomes of the bachelor's degree programme Geodesy and Cartography and of the master's degree programmes Geodesy and Cartography do comply with the engineering specific part of Subject-Specific Criteria of the Technical Committee Mechanical Engineering.

Der Fachausschuss 11 – Geowissenschaften empfiehlt die Siegelvergabe für die Studiengänge wie folgt:

Degree Programme	ASIIN seal	Subject-specific Label	Maximum duration of accreditation
B.Sc. Cadastre	With requirements for one year	n.a.	30.09.2019
B.Sc. Land Management	With requirements for one year	n.a.	30.09.2019

B.Sc. Geodesy and Cartography	With requirements for one year	EUR-ACE® with requirements	30.09.2019
M.Sc. Geodesy	With requirements for one year	EUR-ACE® with requirements	30.09.2019
M.Sc. Cartography	With requirements for one year	EUR-ACE® with requirements	30.09.2019
B.Sc. Meteorology	With requirements for one year	n.a.	30.09.2019
M.Sc. Meteorology	With requirements for one year	n.a.	30.09.2019

Auflagen und Empfehlungen für die zu vergebenden Siegel

Requirements

For all degree programmes

A 1. (ASIIN 2.3) The module descriptions have to be enhanced as stated in the report (description of practical tasks in laboratory practice and internships/calculation of grades at module level). There have to be module descriptions for all parts of the programmes (missing module descriptions).

A 2. (ASIIN 5.3) The laboratory equipment has to be enhanced to enable the departments to broaden their research performance as a basis for a research-based teaching in the master´s programmes. The equipment mentioned in the report is meant as an example for an equivalent level.

A 3. (ASIIN 3.2) The transformation of the Kazakh credit points into ECTS points must correspond to the ECTS regulation that one credit point bases on 25-30 hours student workload.

A 4. (ASIIN 7.2) An English diploma supplement has to be provided as a separate document, specifying the qualification achieved.

For the B.Sc. Geodesy and Cartography programme

A 5. (ASIIN 2.6) A concept has to be provided, how the fundamental education in mathematics, physics and computer science closely related to engineering education are going to be enhanced as described in this report.

For the M.Sc. Geodesy and M.Sc. Cartography programmes

A 6. (ASIIN 2.2, EUR-ACE) A concept has to be provided, how research orientation and compliance to international standards in Geodesy and Cartography are going to be enhanced as indicated by this report. This concept has to refer to laboratory equipment, staff development, international cooperation and the defined learning outcomes of the programmes.

For the M.Sc. Meteorology programme

A 7. (ASIIN 2.2) A concept has to be provided, how research orientation and compliance to international standards in Meteorology are going to be enhanced as indicated by this report. This concept has to refer to laboratory equipment, staff development, international cooperation and the defined learning outcomes of the programme.

Recommendations

For all degree programmes

E 1. (ASIIN 2.6). The definition of the programmes should be based on academic aspects more strongly.

E 2. (ASIIN 5.2) The options of staff for taking sabbaticals should be enhanced to pursue the transition to a research oriented university.

E 3. (ASIIN 3.1, 5.2) International mobility in the programmes should be enhanced to achieve a higher level of international academic experience. This counts for staff as for students as well. Data on mobility should be integrated into the management information the faculty is relying on.

E 4. (ASIIN 2.3) The English-language policy should be actively pursued. This includes more subject specific modules taught in English.

For the bachelor´s programmes in cadastre and land management

E 5. It is recommended to integrate international cadastre concepts and standards into the curriculum, especially the UN ECE Land Administration Guidelines and follow-up concepts of the Working Party on Land Administration (WPLA), the ISO TC 2011 standards, especially the Land Administration Domain Model (LADM), and Cadastre 2014 of FIG.

H Decision of the Accreditation Commission (26.09.2014)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The Accreditation Commission discussed the procedure and followed the Technical Committee Geosciences regarding its editorial amendments to the wording of some requirements and recommendations. Additionally, it deleted the second part of the recommendation for the Bachelor´s programmes in Cadastre and Land Management as it was deemed too specific.

Assessment and analysis for the award of the EUR-ACE® seal:

The Accreditation Commission deemed that the intended learning outcomes of the Bachelor's degree programme Geodesy and Cartography and of the Master's degree programmes Geodesy and Cartography do comply with the engineering specific part of Subject-Specific Criteria of the Technical Committee Civil Engineering.

The Accreditation commission decided to award the seals as follows:

Degree Programme	**ASIIN seal**	**Subject-specific Label**	**Maximum duration of accreditation**
B.Sc. Cadastre	With requirements for one year	n.a.	30.09.2019
B.Sc. Land Management	With requirements for one year	n.a.	30.09.2019
B.Sc. Geodesy and Cartography	With requirements for one year	EUR-ACE® with requirements	30.09.2019
M.Sc. Geodesy	With requirements for one year	EUR-ACE® with requirements	30.09.2019
M.Sc. Cartography	With requirements for one year	EUR-ACE® with requirements	30.09.2019
B.Sc. Meteorology	With requirements for one year	n.a.	30.09.2019
M.Sc. Meteorology	With requirements for one year	n.a.	30.09.2019

Requirements

For all degree programmes

A 1. (ASIIN 2.3) The module descriptions must be updated according to the comments made in the accreditation report (description of practical tasks in laboratory practice and internships/calculation of grades at module level). There have to be module descriptions for all parts of the programmes (missing module descriptions must be provided).

A 2. (ASIIN 5.3) The laboratory equipment has to be enhanced to enable the departments to broaden their research performance as a basis for a research-based teaching in the master´s programmes. The equipment mentioned in the report is meant as an example for an equivalent level.

A 3. (ASIIN 3.2) The transformation of the Kazakh credit points into ECTS points must correspond to the ECTS regulation that one credit point is awarded for 25-30 hours student workload.

A 4. (ASIIN 7.2) A programme-specific Diploma Supplement has to be prepared and handed out to students on a regular basis providing information about the objectives, intended learning outcomes, structure and level of the degree, as well as about an individual's performance. It must also explain the educational system of Kazakhstan in order to foster comprehensibility and comparability between the educational systems.

For the B.Sc. Geodesy and Cartography programme

A 5. (ASIIN 2.6) A concept has to be provided, how the fundamental education in mathematics, physics and computer science closely related to engineering education are going to be enhanced as described in this report.

For the M.Sc. Geodesy and M.Sc. Cartography programmes

A 6. (ASIIN 2.2) A concept has to be provided, how research orientation and compliance to international standards in Geodesy and Cartography are going to be enhanced as indicated by this report. This concept has to refer to laboratory equipment, staff development, international cooperation and the defined learning outcomes of the programmes.

For the M.Sc. Meteorology programme

A 7. (ASIIN 2.2) A concept has to be provided, how research orientation and compliance to international standards in Meteorology are going to be enhanced as indicated by

this report. This concept has to refer to laboratory equipment, staff development, international cooperation and the defined learning outcomes of the programme.

Recommendations

For all degree programmes

E1. (ASIIN 2.6) The definition of the programmes should be based on academic aspects more strongly.

E2. (ASIIN 5.2) The options of staff for taking sabbaticals should be enhanced to pursue the transition to a research oriented university.

E3. (ASIIN 3.1, 5.2) International mobility in the programmes should be enhanced to achieve a higher level of international academic experience. This counts for staff as for students as well. Data on mobility should be integrated into the management information the faculty is relying on.

E4. (ASIIN 2.3) The English-language policy should be actively pursued. This includes more subject specific modules taught in English.

For the bachelor´s programmes in cadastre and land management

E5. (ASIIN 2.6) It is recommended to integrate international cadastre concepts and standards into the curriculum.