Mining and Metallurgical Institute named after O.A. Baikonurov
«Mine Surveying and Geodesy» department

EDUCATIONAL PROGRAM
« 6B07304 - Geospatial digital Engineering »

Education Area code and classification: 6B07 Engineering Manufacturing and Civil engineering
Training area code and classification: 6B073 Architecture and Civil engineering
Group of educational programs: B075 Cadastre and land Management
NRC level: 6
ORC Level: 6
Duration of training: 4 years
Amount of credits: 242

Almaty 2022

Educational program 6B07304 «Geospatial digital engineering» was approved at a meeting of the Academic Council of KazNRTU named after. K.I. Satpaeva.
Protocol № 13 of "28" 04 2022
Considered and recommended for approval at a meeting of the Educational and Methodological Council of KazNRTU named after. K.I. Satpaeva.
Protocol № 13 of "28" 04 2022

Educational program 6B07304 «Geospatial digital engineering» developed by the academic committee in the direction of "Geospatial Digital Engineering"

Full name	Academic degree / academic title	Position	Place of work	Signature
Chairman of the Academic Committee:				
Kochetova M.A.		director	«Leica Geosystems Kazakhastan»	
Academic staff:				
Orynbassarova E.O.	Doctor PhD	head of department	SU	
Nukarbekova Zh.M.	M.T.H.	Senior Lecturer	SU	
Employers:				
Alpysbay M.	M.t.s.	head of department	RSE ON PCV "NATIONAL CENTER FOR GEODESY OF SPATIAL INFORMATION	
Narbaev M.M.		director	TOO "ALIGeo"	
Students				
Tohan A.E.		3rd year students		

Table of contents

List of abbreviations and symbols

Table 1-Abbreviations used

Reduction	Full name
ECTS	European Credit Transfer and Accumulation System
NJSC SU	NJSC Satbayev university
MES RK	Ministry of Education and Science of the Republic of Kazakhstan
TS	Teaching staff
EP	Educational program
RO	Registrar's Office
WC of the EP	Working curriculum of the EP

1. Description of the educational program

The Geospatial Digital Engineering educational program is a first-level qualification of three levels of the higher education system. At the expense of the qualification module and final qualification work of bachelors of the educational program.

2. The purpose and objectives of the educational program

Goal EP: The purpose of the educational program is to prepare the graduate as a competitive specialist in the field of land management and cadaster, with critical thinking, able to use theoretical and practical information to perform land management and cadastral works in the field of monitoring of land and real estate, cadastral and economic assessment of land and other real estate, regulatory framework in the development of projects.

Tasks EP:

Task 1: Task 1: preparing a graduate for organizational activities that exclude negative phenomena in professional activities, the development of spiritual values, moral and ethical standards of the individual as a member of society, the implementation of the legal and legislative system of the Republic of Kazakhstan with a high level of professional culture, citizenship;

Task 2: preparation of the graduate for activities for continuous self-improvement and self-development, mastering new knowledge, skills and abilities in innovative areas of land management and cadastre;

Task 3: preparation of a graduate, based on the diversity and dynamism of the catalog of elective disciplines of the curriculum, with a predominance of practical skills in competencies, capable of performing professional functions within one or more types of activities based on the final learning outcomes that take into account the specifics of these types of activities, market requirements for organizational and managerial , professional competencies

Task 4: preparation of the graduate as a competitive specialist in the field of land management and cadastre;
including on the basis of increasing the international aspect in educational, scientific programs, competent in the field of advanced land management and cadastre technologies, and formalizing the results of scientific research.

3. Requirements for the evaluation of learning outcomes of the educational program

Learning outcomes include knowledge, skills and competencies and are defined both for the educational program as a whole and for its individual modules, disciplines or tasks.

The main task at this stage is to select assessment methods and tools for all types of control, with the help of which it is possible to most effectively assess the achievement of planned learning outcomes at the discipline level.

4. Passport of the educational program

4.1 General information

№	Field Name	Note
1	Code and classification of the field of education	6B07 Engineering, Manufacturing and Civil engineering
2	Code and classification of training	6B073 Architecture and civil engineering
3	Group of educational programs	B075 Cadastre and land management
4	Name of the educational program	6B07304 Geospatial Digital Engineering
5	Brief description of the educational program	Educational program "Geospatial Digital Engineering" – This is a first-level qualification of the three levels of higher education.
6	EP purpose:	The purpose of the educational program is to prepare the graduate as a competitive specialist in the field of land management and cadaster, with critical thinking, able to use theoretical and practical information to perform land management and cadastral works in the field of monitoring of land and real estate, cadastral and economic assessment of land and other real estate, regulatory framework in the development of projects.
7	EP type:	New EP
8	Level on NQF	6
9	Level on SQF	6
10	EP distinctive features	No
11	List of competencies of the educational program:	12
12	The formed educational outcomes:	1.Own a system of subject, methodological, social and humanitarian, environmental, economic know ledge, apply the legal framework in the field of

		professional activity and labor protection. 2. Analyze the theory and practice of entrepreneurship as a system of economic, organizational and legal relations between business structures. Apply professional ethical standards of master the techniques of professional communication. Be able to work in a team, tolerantly perceiving social, ethnic, confessional and cultural differences. 3. Use scientific methods and techniques for researching a particular science; summarize the results of the study; synthesize new knowledge and present it in the form of socially significant products; carry out the choice of methodology and analysis; apply the basics of mathematical, chemical and physical knowledge in professional activities using software. 4. Apply modern geodetic equipment, including UAVs, ground and satellite positioning technologies in solving cadastral and land management tasks. 5.Apply GIS technologies to solve the problems of land cadastre and land management, including the implementation of cadastral registration in the GIS environment and spatial fixing of land plots. Use practical work skills and analyze methods for creating and updating digital topographic bases of cadastral plans and maps, as well as automating cartographic work using software. 6. Use the legal framework for cadastral valuation of land; methods of zoning the territories of cities and rural settlements; perform state cadastral valuation of land. Interpret the cadastral and market value of the land plot and the results of their examination. Determine the economic efficiency in the preparation of estimate documentation. 7. Control compliance with the land legislation of the Republic of Kazakhstan by state bodies, individuals, legal entities and officials. Interpret the rules for the use of land plots, maintaining the land cadaster and land management, implementing measures for the rational use and protection of land. 8. Perform classification and diagnostics of soils, assessment of the main types of soils according to morphological, chemical and physical-mechanical characteristics. Know the factors of deterioration of soil fertility and methods for their elimination, melioration and soil protection. Own the methods of soil assessment, calculation of the quality score and compilation of soil maps using GIS technologies.

		9. Use the basic regularities of the territorial physical and geographical differentiation of the geographical envelope, the properties of the natural landscape and its structures, natural and anthropogenic factors that determine the functioning and development of landscapes. Classify natural and anthropogenic landscapes, design landscape maps and maps of physical and geographical zoning using aerospace survey data. 10. Learn methods of land and real estate management. Organize and carry out cadastral and land management work, including the determination of the boundaries of land plots with the help of modern geodetic equipment, observing the rules of safety and life. 11. Apply Earth remote sensing data in solving cadastral and land management problems; perform aerial photography of land using unmanned aerial vehicles; perform photo-geometric processing of geodetic data, apply GIS technologies to create cadastral and soil maps, digital terrain models and objects. 12. Apply GIS technologies, system engineering methodology, design automation systems, information-communication technology standards, and modern programming languages in professional activities.
13	Form of study	Daytime
14	Period of study	4 years
15	Volume of the credits	242
16	Language of education	Russian, Kazakh
17	The awarded academic degree	Bachelor
18	Developer(s) and authors:	Department MSaG

4.2. The relationship between the achievability of the formed learning outcomes in the educational program and academic disciplines

#	Name of the discipline	Short description of the discipline	Number of credits	Generated learning outcomes (codes)											
				LR1	LR2	LR3	LR4	LR5	LR6	LR7	LR8	LR9	LR10	LR11	LR12
Cycle of general education disciplines University component															
1	Life safety	The purpose of the discipline: the formation of knowledge of a conscious and responsible attitude to the safety of life. Brief description: Organizational and theoretical foundations of life safety. Emergencies, causes, consequences, analysis. Lesions. A man in a world of dangers. Ensuring the safety of the population and territories in emergency situations. The main ways and means of protecting the population. Elimination of consequences of emergency situations. Safety and environmental friendliness of technical systems.	2	v									v		
2	Fundamentals of Entrepreneurship, Leadership and Anti-corruption culture	The purpose of the discipline: the formation of knowledge on the theory and practice of entrepreneurship, the anti-corruption model of behavior and the public atmosphere of	3	v	v					v					

		rejection of corruption. Summary: the system of economic, organizational and legal relations of business structures. Leadership and teamwork skills. The causes of corruption and methods of combating it. Anti-corruption and a civil position in relation to this phenomenon.													
3	Ecology and sustainable development	The purpose of the course: the formation of ecological knowledge and consciousness, knowledge about the general ecology. Brief description: Fundamentals of sustainable development of nature and society. Environmental problems of our time. The concept and principles, indicators and goals of sustainable development. Modern methods of rational use of natural resources and environmental protection. The importance of green technologies and the efficient use of renewable resources for sustainable development.	2	v		v									
Cycle of basic disciplines University component															
4	Geodetic instruments	To master modern geodetic instruments, methods and methods for performing	5				v						v		

		measurements with them to determine the boundaries and areas of land. To master work with satellite positioning technologies, unmanned aerial vehicles and laser scanners to accompany cadastral work. Learn how to perform topographic and geodetic work with the necessary accuracy to create cadastral plans and maps. Independently choose the necessary set of geodetic tools when solving land cadastral problems.													
5	Geodesy (Introduction to the specialty)	To master the basic concepts of the shape and size of the Earth, as well as the coordinate systems used in geodesy. Get skills in solving problems on a topographic map of various scales, including determining the boundaries and areas of land. Learn how to perform angular and linear measurements on the ground to create cadastral plans, as well as support land management projects.	8				v						v		
6	State control of use and protection of lands	To study the conditions for compliance with the land legislation of the Republic of Kazakhstan by state bodies,	5	v	v					v					

		individuals, legal entities and officials, as well as methods for identifying and eliminating violations of the legislation of the Republic of Kazakhstan. To be able to control the correctness of maintaining the land cadastre and land management, as well as the implementation of measures for the rational use and protection of land.													
7	Engineering geodesy	Perform geodetic measurements with the help of modern geodetic instruments, in order to draw up projects for land management, agricultural reclamation, planning and development of rural settlements; create a geodetic basis for surveying land plots and surveying real estate objects; perform topographic surveys and process field measurement data in professional software when preparing cadastral plans and supporting land management works.	5				**v**						**v**		
8	Engineering and computer graphics	The purpose of the discipline: the formation of basic knowledge about design documentation, spatial imagination, the basics of	5			**v**									**v**

		building drawings, taking into account compliance with the requirements of basic standards. Summary: all possible combinations of geometric shapes on the plane, research and their measurements. Image conversion. Technical drawings. Fundamentals of automated preparation of the graphic part of design documents in the AutoCAD environment.													
9	Cartography	To study the mathematical basis of maps and types of cartographic projections for compiling land use maps, and land cadastral plans. To study methods for determining distortions on maps of angles, shapes, areas to assess the quality of cadastral plans and maps. To master cartographic methods of depicting the relief and the situation for compiling agrochemical and agroclimatic maps in solving various land management problems, in assessing natural resources and land.	5					v				v			
10	Mathematics I	The course is devoted to the study of the basic concepts of higher mathematics and its	5	v		v									

		applications. The main provisions of the discipline are applied in the teaching of all general education engineering and special disciplines taught by graduate departments. The course sections include elements of linear algebra and analytical geometry, an introduction to analysis, differential calculation of functions of one and several variables. Methods for solving systems of equations, problems of using vector calculations in solving problems of geometry, mechanics, and physics are considered. Analytical geometry on a plane and space, differential calculation of functions of one variable, derivatives and differentials, study of the behavior of functions, derivative and gradient in direction, extremum of a function of several variables.													
11	Mathematics II	The discipline is a continuation of Mathematics I. sections of the course include integral calculus of a function of one variable and several variables, series theory.	5	v		v									

		Indefinite integrals, their properties and methods of their calculation. Certain integrals and their application. Incorrect integrals. Numerical series theory, functional series theory, Taylor and Macloren Series, application of series to approximate calculations.														
12	General chemistry	The purpose of the discipline is to study the basic concepts and laws of chemistry; fundamental laws of chemical thermodynamics and kinetics; quantum mechanical theory of atomic structure and chemical bonding. Solutions and their types, redox processes, coordination compounds: formation, stability and properties. The structure of matter and the chemistry of elements.	5	v		v										
13	Organization and planning of land cadastre works	To master the regulation of land relations and land use rights, the calculation of the volume of land management work and the preparation of a balance of personnel; structuring the system of land resources; creation of land management groups; wage fund; calculation of labor income. To study the	5		v			v	v							

		management of land management and cadastral work, budgeting, costing and acceptance of work, as well as keeping records and monthly reporting on the amount of work performed.													
14	Estimation of land	The course contains a training program aimed at studying the theoretical foundations of the state land cadastre, which allows you to conduct a qualitative and economic assessment of land. The course is structured in such a way as to teach students the theoretical foundations of the state land cadastre and land valuation. Students should study land law, land accounting and the land fund of the Republic of Kazakhstan.	5	v					v		v				
15	Pedology	To master the basic genetic features of the formation of the earth's soil cover, soil classification, knowledge of soil diagnostics and modern concepts about the concepts of soil landscapes, evaluation of the main types of soils according to their agrotechnical characteristics, taking into account the	5								v			v	

		peculiarities of their use and factors contributing to soil salinization.													
16	Theoretical basis of land management	The study of the discipline consists in the formation of competencies in the tasks of rational use of land and protection, classification of land by suitability. The basics of land management, the functions and role of land as a means of production, accounting and economic condition of land, distribution of land in the Land Fund of the Republic of Kazakhstan, types of land management tasks and design will be studied. Students will know the principles of the territorial organization of production and distribution of land by land.	5	v						v					
17	Land Management control	Master knowledge about land resources to organize the rational use of land and determine measures to reduce the anthropogenic impact on the territory. Learn to apply knowledge of the laws of the country for the legal regulation of land and property relations and control over the use of land and real estate. Use knowledge to	5	v	v			v							

		manage land resources and real estate, as well as in the organization and conduct of cadastral and land management works.													
18	Physics	The course studies the basic physical phenomena and laws of classical and modern physics; methods of physical research; the influence of physics as a science on the development of technology; the relationship of physics with other sciences and its role in solving scientific and technical problems of the specialty. The course covers the following sections: mechanics, mechanical harmonic waves, fundamentals of molecular kinetic theory and thermodynamics, electrostatics, direct current, electromagnetism, geometric optics, wave properties of light, laws of thermal radiation, photoelectric effect.	5	v		v									
19	Photogrammetry	To study the basics of the technology of modern photogrammetric processes, including methods for performing aerial surveys, their cameral processing, and	5			v								v	

		analysis of the accuracy of the obtained materials, as well as methods for using them to create and update topographic maps and cadastral plans. Apply modern technologies and software products in solving land management and cadastral tasks, as well as perform the optimal choice of satellite imagery materials and their integration into GIS programs when creating cadastral maps.													
20	Digital mapping	Get theoretical knowledge and practical skills in using software for creating and updating digital cadastral plans and maps. To study methods for creating digital and electronic maps, as well as automation of cartographic support for land management work. To master the technology of creating digital topographic maps containing logical and mathematical descriptions of mapped objects and the relationship of terrain objects in the form of their combinations, intersections and neighborhoods.	5					v			v	v		v	
Cycle of basic disciplines															

Elective component															
21	Soil assessment	Obtain theoretical knowledge and practical skills in determining and evaluating soils by morphological, chemical and physical-mechanical features. To study the spatial features of the distribution of soils and the degree of their influence on the quality and productivity of soils, the factors of deterioration in soil fertility and methods for their elimination, melioration and soil protection. To master the methods of soil assessment, the calculation of the bonitet score and the compilation of soil maps.	3			v					v	v	v		
22	Cadastral sounding, valuation and taxation	To study the legal framework for the cadastral valuation of land, to get an idea of the zoning and taxation of land. Master the methods of zoning the territories of cities and rural settlements for the functional use of land. Master the issues of organizing the state cadastral valuation of land. Get an idea of the cadastral and market value of the land, the results and expertise of the cadastral	5					v	v						

		value of land. To study the issues of consideration of disputes about the results of determining the cadastral value of land.													
23	Landscape science	To master the structural elements of the landscape shell and the principles of its systemic organization, the natural geographical components of landscapes (geosystems), their unity, interconnections and interdependence. To study the main methods of landscape research and features of the organization of complex geographical research; criteria for assessing territorial ecological situations, landscape systematics and types of landscapes on the Earth. Know the factors, mechanisms and history of the formation of anthropogenic landscapes, as well as the principles of anthropogenic compatibility.	3			v					v	v		v	
24	Land reclamation	Master theoretical knowledge in the field of regulation of water and associated air, food, thermal and salt regimes of soils in combination with appropriate agricultural	5			v					v				

		technology and landscape features. To study methods for creating and maintaining optimal conditions in the "soil-plant" system to increase the stability of agricultural production and the environmental sustainability of agro-reclamation landscapes, as well as to prevent water and wind erosion of soils and to reclaim technogenic landscapes.													
25	Management of land surveying and cadastral works	To study the features of managing cadastral activities in market conditions, the basics of economic regulation of activities and the economic aspects of creating a new cadastral enterprise. Know the basic requirements of civil and administrative legislation in relation to land cadastral activities. Master the methodology for drawing up a business plan for the organization of land management and cadastral enterprises. Master the methodology of planning and organizing cadastral work, as well as be able to perform calculations to optimize land	5		v				v						

		management and cadastral work.													
26	Occupational health and safety at industry	The discipline contributes to the formation of students knowledge, abilities and skills according to the methods and ways of protecting workers at industry, identifying dangerous and harmful industrial factors and mastering the methods of calculating protec-tion against them. The discipline acquaints students with the regulatory framework for occupational health and safety, the study of harmful industrial factors, familiarization with the causes of accidents and occupational diseases at work, the main measures to protect workers at the enterprise.	5	v						v					
27	Remediation and protection of lands from erosion	Master basic knowledge for solving theoretical and practical professional problems in the field of land reclamation and reclamation; find the right solutions to prevent, identify and eliminate violations of the use and protection of land, land and water legislation; develop technical specifications for the design of land reclamation and	5	v		v				v	v				

		reclamation works; develop projects for the organization of the territory for engineering and reclamation of the territory.													
Cycle of profile disciplines University component															
28	Automated technologies for conducting cadastral works	The aim of the course is to form students' knowledge of modern automated land information systems. Student must know the regulatory framework for regulating land relations of the Republic of Kazakhstan, the structure of land management and cadastral institutions and can use automated GIS systems in the cadaster.	5				**v**	**v**						**v**	**v**
29	Geoinformation technologies in land management	Acquire theoretical knowledge and practical skills in the formation of data on land resources, the principles and systems of geoinformation technologies related to the regulation of land relations. The student must master the hardware and software, GIS software, the principles of database formation and the design of specialized GIS. Learn to apply GIS technologies to solve land cadastre tasks, including	5					**v**						**v**	**v**

		performing cadastral registration in a GIS environment and spatial fixing of land plots.													
30	State registration and accounting of lands	To study the basics of registration of property rights to real estate and transactions with it, the patterns and prospects for the development of a unified accounting and registration system of the Republic of Kazakhstan. Be able to analyze legal relations and regulations in the field of registration of rights and accounting for real estate, interpret and apply these acts; solve practical problems, applying regulatory legal acts in the field of accounting and registration actions. Possess skills in working with legal acts.	5		v				v	v					
31	Basics of the cadastre	Master the basics of land, water, legal and multifunctional cadastre, as well as the system of accounting, registration and evaluation of land. To study the procedure for carrying out cadastral activities, automate the information system of the state land cadastre, which allows filling out basic land	5	v					v						

		cadastral documents, providing information support for decisions of executive authorities, providing information support to the real estate market, developing market relations, protecting and rationally using land.													
Cycle of profile disciplines Elective component															
32	Global navigation satellite systems	To study the basic principles of satellite positioning technologies, absolute and relative methods of satellite measurements to determine the boundaries and areas of land. To study the differential method of GNNS, as well as the specifics of the use of pseudorange and phase measurements. Familiarize yourself with the coordinate and time systems used in satellite observations in order to provide geodetic support for cadastral work. Master methods for calculating the instantaneous position of satellites and orbital parameters of satellites, as well as methods for calibrating and equalizing satellite measurements.	5				**V**						**V**		

33	Remote sensing of the earth	To master the methods of processing and analyzing satellite imagery data for solving cadastral and land management problems. To study the physical foundations of remote sensing of the Earth, modern sensors operating in active and passive modes, as well as existing satellite navigation systems. Control the use of land, the implementation of measures for the protection and rational use of land. Investigate changes in soil cover according to satellite imagery data.	5							v		v		v	
34	The land-owner. device and plan of the population	Master theoretical knowledge and practical skills in the field of drawing up projects and plans for land management and planning of settlements and master the methodology for their development. To study the basic provisions of territorial planning and to master the architectural, planning and spatial organization of populated areas. Analyze the problem of rational use of land and the establishment of boundaries of rural settlements.	2					v	v						

35	Land law	Master knowledge in the field of legal regulation of land relations. Students will know the features of the processes of formation of the system of the legal basis for land management and the cadastre, the legislative framework for land legal relations regarding real estate. They will get acquainted with the issues of the legal cadastre, the principles of the right to a land plot, real estate, methods of legal regulation of land and property relations in accordance with the legislation of the Republic of Kazakhstan.	5	v	v										
36	Land Use Planning	Acquire theoretical knowledge and practical skills that allow you to master the methodology for performing land management design. To study the principles of land management, classification and content of land management projects. Know the assessment of the economic efficiency of design solutions, ways of organizing land use and land ownership, design features of land holdings for various purposes.	5		v					v					

		To master the principles of land management design, taking into account the conditions of various territories.													
37	Basics of laser scanning	To study the principle of operation of terrestrial laser scanners, types and sources of errors in laser scanning, as well as technological schemes of terrestrial laser scanning. To master the methods of external orientation of scans, analysis of the accuracy of external orientation of scans and the technique of laying scanner passages. Learn how to work with software products for processing terrestrial laser scanning data, and apply scanning technology in cadastral registration and cadastral valuation of real estate.	5				v							v		
38	Planning and construction of settlements	Master the conceptual foundations of urban planning and planning of settlements. To form a managerial outlook based on knowledge of the features of territorial planning, urban zoning and planning of the territories of settlements. Get skills in urban planning culture, territory planning, as	2		v			v		v						

		well as the organization of a residential area and residential development. To study the arrangement of the public center of the settlement, territories and sites of public institutions, as well as the industrial zone of settlements.													
39	Territorial planning and forecasting	Get an idea about territorial planning and forecasting on the use of land resources and on ensuring the use of land in areas that are environmentally unfavorable. Master the methods of development and adoption of management decisions in land management and cadastre. Own the methodology for developing projects for the use of land resources, land management schemes and other design and forecast materials. Be able to take into account the target setting for the development of a market mechanism for land use.	5					v	v	v					

5. Curriculum of the educational program

MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I.SATPAYEV

SATBAYEV UNIVERSITY

APPROVED
Chairman of the Management Board-
Rector of KazNRTU named after K. Satpayev
M.Zh. Begentaev
"___" _____ 2022 y.

CURRICULUM
of Educational Program on enrollment for 2022-2023 academic year

Educational program 6B07304 - "Geospatial digital engineering"
Group of educational programs B07304 - "Cadastre and land management"

Form of study: full-time **Duration of study: 4 years** **Academic degree: Bachelor of Agriculture**

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	classroom volume of lek/lab/p	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training based on courses and semesters							
								I course		II course		III course		IV course	
								1 semester	2 semester	3 semester	4 semester	5semester	6 semester	7 semester	8 semester
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)															
M-1. Module of language training															
LNG 108	English language	GED, RC	10	300	0/0/6	210	E	5	5						
LNG 104	Kazakh (Russian) language	GED, RC	10	300	0/0/6	210	E	5	5						
M-2. Module of physical training															
KFK 101-104	Physical Culture	GED, RC	8	240	0/0/8	120	Difcredit	2	2	2	2				
M-3. Module of information technology															
CSE 677	Information and communication technologies (in English)	GED, RC	5	150	2/1/0	105	E				5				
M-4. Module of socio-cultural development															
HUM 100	Modern History of Kazakhstan	GED, RC	5	150	1/0/2	105	SE		5						
HUM 132	Philosophy	GED, RC	5	150	1/0/2	105	E				5				
HUM 120	Socio-political knowledge module (sociology, politology)	GED, RC	3	90	1/0/1	60	E				3				
HUM 134	Socio-political knowledge module (culturology, psychology)		5	150	2/0/1	150	E			5					
M-5. Module of anti-corruption culture, ecology and life safety base															
HUM 133	Fundamentals of anti-corruption culture	GED, CCH	5	150	2/0/1	150	E			5					
MNG 488	Fundamentals of Entrepreneurship and Leadership														
CHE 656	Ecology and life safety														
CYCLE OF BASIC DISCIPLINES (BD)															
M-6. Module of physical and mathematical training															
MAT 101	Mathematics I	BD, UC	5	150	1/0/2	105	E	5							
PHY 111	Physics I	BD, UC	5	150	1/1/1	105	E	5							
MAT 102	Mathematics II	BD, UC	5	150	1/0/2	105	E		5						
M-7. Module of basic training															
GEN 429	Engineering and computer graphics	BD, UC	5	150	1/0/2	105	E	5							
	Planning of inhabited places	BD, UC	3	90	1/0/1	60	E	3							
MAP536	Geodesy	BD, UC	6	180	2/0/2	105	E		6						
MAP537	Cartography	BD, UC	6	180	2/0/2	105	E			6					
M-8. Module Engineering works															
MAP489	Theoretical basis of land management	BD, UC	5	150	1/0/2	105	E			5					
MAP496	Pedology	BD, UC	5	150	1/0/2	105	E				5				
MAP477	Digital mapping	BD, UC	5	150	1/0/2	105	E				5				
MAP490	Land Management control	BD, UC	5	150	1/0/2	105	E				5				
MAP481	Geodetic instruments	BD, UC	5	150	1/0/2	105	E					5			
MAP491	Organization and planning of land cadastre works	BD, UC	5	150	1/0/2	105	E					5			
MAP547	Cadastral sounding, valuation and taxation	BD, UC	4	120	1/0/2	75	E					4			
MAP191	State control of use and protection of lands	BD, UC	5	150	1/0/2	105	E						5		
MAP187	Monitoring of land use	BD, UC	5	150	2/0/1	105	E							5	
MAP402	Remediation and protection of lands from erosion	BD, UC	5	150	1/0/2	105	E								5
3204	Elective	BD, CCH	5	150	1/0/2 1/0/2	105	E					5			
3205	Elective	BD, CCH	5	150	1/0/2 1/0/2	105	E					5			
3206	Elective	BD, CCH	5	150	1/0/2 2/0/1	105	E						5		

3207	Elective	BD, CCH	4	120	1/0/2 2/0/1	75	E						4		
4202	Elective	BD, CCH	6	180	2/0/2 2/0/2	120	E							6	
CYCLE OF PROFILE DISCIPLINES (PD)															
M-9. Module of professional activity															
MAP476	Basics of the cadastre	PD, UC	5	150	1/0/2	105	E			5					
MAP155	Photogrammetry	PD, UC	5	150	1/0/2	105	E						5		
MAP546	Geoinformation technologies in land management	PD, UC	6	180	2/0/2	120	E							6	
MAP551	State registration and accounting of lands	PD, UC	6	180	2/0/2	120	E							6	
M-10.Module Work design															
3301	Elective	PD, CCH	5	150	2/0/1 1/0/2	105	E					5			
3302	Elective	PD, CCH	5	150	1/0/2 1/0/2	105	E						5		
3303	Elective	PD, CCH	4	120	1/0/2 1/0/2	75	E						4		
4301	Elective	PD, CCH	5	150	1/0/2 1/0/2	105	E							5	
4302	Elective	PD, CCH	5	150	1/0/2 1/0/2	105	E							5	
4303	Elective	PD, CCH	5	150	1/0/2 1/0/2	105	E								5
M-11. Module "R&D"															
3304	Elective	PD, CCH	5	150	1/0/2	105	E								5
M-12. Module Practice															
AAP184	Educational practice	BD, UC	2						2						
AAP174	Production practice I	PD, UC	2								2				
AAP187	Production practice II	PD, UC	3										3		
M-12. Module of final attestation															
ECA003	Preparation and writing of a thesis (project)	FA	6												6
ECA103	Defense of the thesis (project)	FA	6												6
M-13. Module of additional types of training															
AAP500	Military affairs	ATT	0												
Total based on UNIVERSITY:								30	30	28	32	29	31	33	27
								60		60		60		60	

Number of credits for the entire period of study

Cycle code	Cycles of disciplines	Credits: required component (RC)	university component (UC)	component of choice (CCH)	Total
GED	Cycle of general education disciplines	51		5	56
BD	Cycle of basic disciplines		86	25	111
PD	Cycle of profile disciplines		27	34	61
	Total for theoretical training:	*51*	*113*	*64*	*228*
FA	Final attestation	12			12
	TOTAL:	63	113	64	240

Decision of the Academic Council of Kaznu named after K.Satpayev. Protocol № 13 от "25" 04 20 22

Decision of the Educational and Methodological Council of Kaznu named after K.Satpayev. Protocol № 7 от "26" 04 20 22

Decision of the Academic Council of the Institute_____. Protocol № 5 от "20" 12 20 21 y.

Vice-Rector for Academic Affairs B.A.Zhautikov

Director Mining and Metallurgical Institute named after K.B. Rysbekov

Head of the Department " Mine surveying and geodesy" E. O. Orynbassarova

Specialty Council representative from A.T.Aimenov