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

EDUCATIONAL PROGRAM

6B07310 - «Land management and cadastre»

Code and classification of the field of education: 6B07 Engineering Manufacturing and Civil engineering
Code and classification of training directions: 6B073 Architecture and Civil engineering
Group of educational programs: B075 Cadastre and land Management
Level based on NQF: 6
Level based on IQF: 6
Study period: 4 years
Amount of credits: 240

Almaty 2024

Educational program 6B07310 - «Land management and cadastre» was approved at a meeting of the Academic Council of KazNRTU named after K.I.Satpayev.
Protocol № 6 of 19.04.2024
Considered and recommended for approval at a meeting of the Educational and Methodological Council of KazNRTU named after K.I.Satpayev.
Protocol № 12 of 22.04.2024

Educational program 6B07310 - «Land management and cadastre» developed by the academic committee in the direction of «Land management and cadastre»

Full name	Academic degree/ academic title	Position	Place of work	Signature
Academic staff:				
Orynbasarova E.O.	PhD	head of department	SU	
Aitkazinova Sh.K.	PhD	Associate Professor	SU	
Abdygalieva S.S.	m.t.s.	senior lecturer	SU	
Employer:				
Aymenov A.T.		Chief Engineer	Republican Cartographic Factory	
student:				
Zhuman U.S.		2nd year student		

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List of abbreviations and symbols

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 educational program "Land Management and Cadaster" is the first level qualification of the three levels of the higher education system. Due to the qualification module and the final qualifying work of the 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: preparation of the graduate for organizational activities that exclude negative phenomena in professional activity, development of spiritual values, moral and ethical norms of the individual as a member of society, implementation of the legal and legislative system of the Republic of Kazakhstan with a high level of professional culture, citizenship;

Task 2: preparation of graduates for continuous self-improvement and self-development, mastering new knowledge, skills and abilities in innovative areas of geodesy and cartography;

Task 3: preparation of a graduate with the acquired competencies to perform calculations in the field of land management and cadastre, design technical solutions, participate in the development of technical specifications for topographic and geodetic, aerospace, cartographic work in the area to solve land management based on a modern educational base of the material and technical base;

Task 4: 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, who is able to perform professional functions within one or more types of activities based on the final results of training, taking

into account the specifics of these types of activities, market requirements for organizational and managerial, professional competencies;

Task 5: preparation of a graduate as a competitive specialist in the field of land management and cadastre, including on the basis of an increase in the international aspect in educational, scientific programs, competent in the field of advanced land management technologies and cadastre implementation, and registration of scientific research results.

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

4.1. General information

№	Field name	Note
1	Code and classification of the field of education	B074 Urban planning, construction work and civil engineering
2	Code and classification of training directions	6B073 Architecture and civil engineering
3	Educational program group	Urban planning, construction works and civil engineering
4	Educational program name	6B07310- Land management and cadaster
5	Short description of educational program	Educational program «Land management and cadaster » – it is a first level qualification of the three levels of the higher education system.
6	Purpose of EP	The purpose of the educational program is to prepare the graduate as a competitive specialist in the field of land management and cadastre, 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	Type of EP	New EP
8	The level based on NQF	6
9	The level based on IQF	6
10	Distinctive features of EP	No
11	List of competencies of educational program	15
12	Learning outcomes of educational program	1. Apply professional knowledge to minimize negative production factors when conducting land management work, analyze the regulatory framework for labor protection, environmental factors and their classification, chemical laws in professional activities 2. Analyze the theory and practice of entrepreneurship as a system of economic, organizational and legal relations of business structures. Apply professional ethical standards, master the techniques of professional communication. Be able to work in a team, tolerantly perceiving social, ethnic, confessional and cultural differences 3. Analyze and use information about chemical and physical properties of the most important inorganic, organic substances, basic information about the theory of substance structure, the doctrine of solutions, information about the laws of organic synthesis, the basics of physical and chemical analysis of substances to understand the theoretical foundations of soil science and soil evaluation

		4. Apply the basics of mathematical knowledge in various fields of activity, apply the theory of partial differential equations to solve and study applied problems, form ideas about the implementation of numerical methods for solving boundary value problems using Matlab 5.To instill the ability to acquire new knowledge using modern educational and information technologies, language programs 6. Perform angular and linear measurements on the ground to create topographic maps and plans of various scales, planning and high-altitude justification of large-scale surveys for the design of engineering structures, mathematical processing and evaluation of measurement accuracy, carry out verification and alignment of geodetic instruments, perform survey and center using modern geodetic equipment; extract geographical information from the cartographic image; transform geographical information in a cartographic view 7. Apply GIS technologies to solve land cadastre tasks, including performing cadastral registration in a GIS environment and spatial fixing of land plots 8. Use practical skills in creating and updating digital topographic bases, plans and maps using software, analyze methods of creating digital and electronic maps, as well as automation of cartographic work. Apply 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 neighborhood 9. Apply modern geodetic equipment, ground-based and satellite positioning technologies to determine the boundaries of land plots and create cadastral plans 10. Apply remote sensing data of the Earth when solving cadastral and land management tasks; perform aerial photography of land plots using unmanned aerial vehicles; apply GIS technologies when creating cadastral and soil maps, digital models of terrain and objects 11. Use the regulatory framework of cadastral land assessment; demonstrate methods of zoning the territories of cities and rural settlements; perform state cadastral land assessment. Interpret the cadastral and market value of the land plot and the results of their examination. Determination of economic efficiency, preparation of budget documentation. 12. To control the observance of the land legislation of the Republic of Kazakhstan by state bodies,

		individuals, legal entities and officials. To interpret the rules of using land plots, keeping land cadastre and land management, implementation of measures on rational use, state monitoring and protection of lands 13. Perform classification and diagnostics of soils, assessment of the main types of soils according to morphological, chemical and physico-mechanical characteristics. Know the factors of soil fertility deterioration and methods of their elimination, land reclamation and soil protection. Possess methods of soil assessment, calculation of the bonus score and compilation of soil maps using GIS technologies 14. Master the methods of land and real estate management. Organize and conduct cadastral and land surveying work, including the determination of land boundaries using modern surveying equipment. Carry out spatial planning of settlements. To be able to carry out state registration and land records, to draw up an annual statistical report on the condition of land. 15. Explain the basic laws 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.
13	Education form	Full-time
14	Period of training	4 years
15	Amount of credits	240
16	Languages of instruction	Russian, Kazakh
17	Academic degree awarded	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	Brief description of the discipline	Number of credits	Formed learning outcomes (codes)														
				LR 1	LR 2	LR3	LR 4	LR 5	LR 6	LR 7	LR 8	LR9	LR10	LR11	LR 12	LR 13	LR 14	LR15
Cycle of general education disciplines Selectable Component																		
1	Foreign language	English is a compulsary subject. According to the results of placement test or IELTS score, students are placed into groups and disciplines. The name of the discipline corresponds to the level of English. When passing from level to level, prerequisites and postrequisites are respected.	5	v														
2	Kazakh (russian) language	Kazakh (Russian) language In this course author considers socio-political, socio-cultural spheres of communication and functional styles of the modern kazakh (russian) language. The course covers the specifics of the scientific style to develop and activate professional communication skills and abilities of students. Also it allows students to leavn the basics of scientific style	5	v														

		practically and develop the ability of production structural and semantic text analysis.																	
3	Physical culture	The purpose of the discipline is to master the forms and methods of forming a healthy lifestyle within the framework of the professional education system. Familiarization with the natural-scientific basics of physical education, knowledge of modern health-improving technologies, basic methods of independent physical education and sports. As part of the course, the student will master the rules of judging in all sports.	8	v															
4	Information and communication technology	The aim of the course is to gain theoretical knowledge in information processing, the latest information technologies, local and global networks, the methods of information protection; Getting the right use of text editor editors and tabulators; creation of base and different categories of applications.	5				v												
5	History of Kazakhstan	The purpose of the discipline is to provide objective historical knowledge about the main stages of the history of Kazakhstan from ancient times	5		v														

		to the present day; introduce students to the problems of the formation and development of statehood and historical and cultural processes; contribute to the formation of humanistic values and patriotic feelings in the student; teach the student to use the acquired historical knowledge in educational, professional and everyday life; evaluate the role of Kazakhstan in world history.																	
6	Philosophy	The purpose of the discipline is to teach students the theoretical foundations of philosophy as a way of knowing and spiritually mastering the world; developing their interest in fundamental knowledge, stimulating the need for philosophical assessments of historical events and facts of reality, assimilating the idea of the unity of the world historical and cultural process while recognizing the diversity of their skills in applying philosophical and general scientific methods in professional activities.	5				V												
7	Module of socio-political knowledge (sociology, political science)	The objectives of the disciplines are to provide students with explanations on	3				V												

		the sociological analysis of society, about social communities and personality, factors and patterns of social development, forms of interaction, types and directions of social processes, forms of regulation of social behavior, as well as primary political knowledge that will serve as a theoretical basis for understanding social -political processes, for the formation of political culture, development of a personal position and a clearer understanding of the extent of one's responsibility; help to master the political, legal, moral, ethical and socio-cultural norms necessary to act in the interests of society, form personal responsibility and achieve personal success.																	
8	Module of socio-political knowledge (cultural studies, psychology)	The purpose of the disciplines is to study the real processes of cultural creative activity of people who create material and spiritual values, identify the main trends and patterns of cultural development, changes in cultural eras, methods and styles, their role in the formation of man and the development of society, as	5			**v**													

		well as master psychological knowledge for the effective organization of interpersonal interaction, social adaptation in the field of their professional activities.																
Cycle of general education disciplines Component of choice																		
9	Fundamentals of anti-corruption culture and law	To increase the public and individual legal awareness and legal culture of students, as well as the formation of a knowledge system and a civic position on combating corruption as an antisocial phenomenon. Improvement of socio-economic relations of the Kazakh society, psychological features of corrupt behavior, formation of an anti-corruption culture, legal responsibility for acts of corruption in various fields.	5		v		v											
10	Fundamentals of economics and entrepreneurship	To develop basic knowledge of economic processes and skills in entrepreneurial activities. The course aims to develop skills in analyzing economic concepts such as supply and demand, and market equilibrium. It includes the basics of creating and managing a business,	5	v	v	v												

		developing business plans, risk assessment, and strategic decision-making.																	
13	Ecology and life safety	Formation of ecological knowledge and consciousness, obtaining theoretical and practical knowledge on modern methods of rational use of natural resources and environmental protection. The study of the tasks of ecology as a science, the laws of the functioning of natural systems and aspects of environmental safety in working conditions, environmental monitoring and management in the field of its safety, ways to solve environmental problems; life safety in the technosphere, emergencies of a natural and man-made nature.	5	v	v	v													
Cycle of basic disciplines University component																			
23	Mathematics	The purpose of mastering the discipline is to form the theoretical and practical foundations of mathematics and its applications. On the basis of studying the mathematics section, to give students the development of thinking and the achievement	5						v										

		of mathematical culture, which is necessary for application in future professional activities. The course is based on the study of mathematical analysis in a volume that allows you to study elementary functions and solve the simplest geometric, physical and other applied problems. The main focus is on differential and integral calculus. The course sections include the differential calculus of functions of one variable, the derivative and differentials, the study of the behavior of functions, complex numbers, and polynomials. Indefinite integrals, their properties and methods of calculation. Certain integrals and their applications. Improper integrals.																	
15	Geodetic instruments	Of studying of discipline "Geodezicheskoe instrumentology" is the study of the design and technical features optical and mechanical surveying instruments, evaluate the accuracy of the instrument. The study of the full cycle (podgotovka, working and	5												**v**	**v**			

		receiving data) work with geodetic instruments. Device and principle of operation of geodetic tools. Definition of precision, detection and komentiranje factors influencing the measurement accuracy. Segments and types of modern GNSS receivers. Types of modern tools, their similarities and differences principially.																
16	Geodesy	He will master the basic concepts of the Shape and size of the Earth, about coordinate systems used in geodesy, about the orientation of lines on the terrain, about plans, maps, profiles, about scale, terrain relief, about angular and linear measurements, about altitude measurements, about methods and measurements of topographic surveys, about the accuracy of geodetic measurements, the use of geodetic instruments, as well as cameral processing of the geodetic measurements obtained.	6								v	v	v					
17	Geoinformatics	Formation of a complex of knowledge in the field of using GIS, when creating digital models, acquiring knowledge	5				v						v					

		and skills in using modern GIS in various types of professional and social activities. Master the methods of creating topographic maps and plans using GIS technology, the principles of creating databases, gain skills in creating GIS using materials from aerospace and ground surveys.																	
18	General Chemistry	Laws, theoretical principles and conclusions that underlie chemical disciplines; properties and relationships of chemical elements based on D.I. Mendeleev's periodic law and modern ideas about the structure of matter; fundamentals of chemical thermodynamics and kinetics; processes in solutions; structure of complex compounds.	5												v	v			v
19	Theoretical Foundations of land management and cadastre	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	5								v	v	v						

		condition of land, land distribution 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 territorial organization of production and distribution of land by land.																
20	Land management	To master knowledge about land resources for the organization of rational use of land and the definition of measures to reduce anthropogenic impact on the territory. To learn how to apply knowledge of the laws of the country for the legal regulation of land and property relations and the implementation of control over the use of land and real estate. To use knowledge for the management of land resources and real estate, as well as in the organization and conduct of cadastral and land management works..	5								v	v	v					
21	Engineering and computer graphics	To develop students' knowledge of drawing construction and skills in developing graphical and textual design documentation in accordance with standards.	5												v		v	

		Students will study ESKD standards, graphic primitives, geometric constructions, methods and properties of orthogonal projection, Monge's projection, axonometric projections, metric tasks, types and features of connections, creating part sketches and assembly drawings, detailing, and creating complex 3D solid objects in AutoCAD.																	
22	Cartography	To study the mathematical basis of maps and types of cartographic projections. Be able to choose and justify the scale, recognize the map projection. Examine the distortions on the maps. To master the cartographic methods of depicting the relief. To study the main sources for compiling thematic and general geographical maps. Master the basic methods of creating maps in ArcGIS.	6						**v**										
24	Land monitoring	The purpose of studying the discipline is the theoretical development of the meaning and role of urban land monitoring in the field of land and natural resources management, land	5						**v**								**v**		**v**

		management and cadastral works, interaction of information systems of land cadastre and land monitoring and includes the following sections: characteristics of urban lands and their features as an object of assessment and monitoring; basic methods of monitoring urban lands; organization of observations monitoring the condition and use of the land fund; remote land monitoring methods; the use of remote sensing data for urban land planning.																	
25	Geodetic works in land management	The purpose of teaching the discipline is to teach students the methods and techniques of calculating areas and designing land plots, transferring them to nature, solving geodetic tasks of performing calculations and determining coordinates for transferring land management projects to the terrain.	5														v	v	v
26	Water resources management	The purpose of teaching the discipline is to train specialists in the field of environmental management and water use with in-depth knowledge of the basics of water resources management. The main tasks in studying the discipline are: -	5								v	v	v						

		a deep understanding of the peculiarities of water resources management and water management complexes within the Republic of Kazakhstan; - to gain knowledge about existing systems of regulation and management of water resources; - have an idea of the organization of the structure of departments involved in solving problems of water bodies, regulating issues of their optimization and restoration, controlling water quality; - gain skills in assessing water management activities in the territory.																
27	Land reclamation	To master theoretical and practical knowledge in the field of regulation of water and related air, food, thermal and salt regimes of soils in combination with appropriate agricultural techniques and landscape features, as well as methods for creating and maintaining optimal conditions in the soil system – plant" to increase the stability of agricultural production and environmental sustainability of agro-reclamation landscapes, prevent water and wind erosion	5												**v**		**v**		

		of soils and reclamation of man-made landscapes.To master theoretical knowledge in the field of regulation of water and related air, food, thermal and salt regimes of soils in combination with appropriate agricultural techniques 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 environmental sustainability of agro-reclamation landscapes, as well as to prevent water and wind erosion of soils and reclamation of man-made landscapes.																	
28	Topographical graphics	The discipline studies the theory and methods of graphic design of cartographic materials used in cartography, geodesy, land management, as well as the use of a graphic software package (CorelDRAW, AutoCAD, etc.). It also includes theoretical knowledge and practical skills in creating a topographic map, a land management plan, compiling	3										**v**				**v**		

		and editing, preparing for publication and publishing maps, drawing and design work, for which it is necessary not only to know the materials, drawing accessories and also to combine the methods and techniques of drawing and designing maps.																
29	Landscape studies	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, interrelationships and interdependencies. To study the main methods of landscape research and the features of the organization of complex geographical research; criteria for assessing territorial environmental situations, the systematics of landscapes and types of landscapes of the Earth. To know the factors, mechanisms and history of the formation of anthropogenic landscapes, as well as the principles of anthropogenic compatibility.	5						v									
30	Estimation of land	The course contains a training program aimed at studying the	5								v	v	v					

		theoretical foundations of the state land cadastre, which allows for a qualitative and economic assessment of land. The course is designed in such a way as to teach students the theoretical foundations of the state land cadastre and land valuation. Students should study the right to land, land accounting and the land fund of the Republic of Kazakhstan.																	
31	State control of land us and protection	To study the conditions for compliance with the land legislation of the Republic of Kazakhstan by state bodies, individuals, legal entities and officials, as well as methods for identifying and eliminating violations of the legislation of the Republic of Kazakhstan. Have an idea of the ways to restore the violated rights of citizens and legal entities, and the need to comply with the rules for the use of land plots. Be able to control the correctness of the land cadastre and land management, as well as the implementation of measures for the rational use and protection of land.	5												v			v	
32	Land reclamation and protection from erosion	To master basic knowledge for solving theoretical and	5						c										

		practical professional tasks in the field of land reclamation and reclamation; to find the right solutions for the prevention, detection and elimination of violations of land use and protection, land and water legislation; to develop technical specifications for the design of land reclamation and reclamation works; to develop projects for the organization of territory for engineering and reclamation of the territory.																	
Cycle of basic disciplines Selectable Component																			
1	Soil science	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, assessment of the main types of soils according to their agrotechnical characteristics, taking into account the peculiarities of their use and factors contributing to soil salinization. The ability to diagnose the soil according to its main characteristics and	5										**v**				**v**		

		characteristic of each soil and climatic zone.																
2	Soil bonification	To gain theoretical knowledge and practical skills in determining and evaluating soils by morphological, chemical, and physico-mechanical characteristics. To study the spatial features of soil distribution and the degree of their influence on soil quality and productivity, factors of soil fertility deterioration and methods of their elimination, land reclamation and soil protection. To master the methods of soil assessment, calculation of the bonus score and preparation of soil maps.	5						v					v				
3	Engineering arrangement of the territory	The purpose of studying the discipline is to provide professional education that promotes social, academic mobility, demand in the labor market, a successful career, work in public institutions that solve the problems of engineering development of the territory. Providing the bachelor with the knowledge and skills necessary to participate in the development of new design techniques,	5															

		technologies for the engineering arrangement of the territory.																	
4	Land law	To master knowledge in the field of legal regulation of land relations. Students will know the specifics of the processes of forming the system of the legal basis of land management and cadastre, the legislative framework of land relations with respect to real estate. They will get acquainted with the issues of the legal cadastre, the principles of the right to land, real estate, methods of legal regulation of land and property relations in accordance with the legislation of the Republic of Kazakhstan.	5						v					v					
5	Fundamentals of sustainable development and ESG projects in Kazakhstan	The goal is for students to master the theoretical foundations and practical skills in the field of sustainable development and ESG, as well as to develop an understanding of the role of these aspects in the modern economic and social development of Kazakhstan. introduces the principles of sustainable development and the implementation of ESG practices in Kazakhstan,	5																

		includes the study of national and international standards, analysis of successful ESG projects and strategies for their implementation in enterprises and organizations.																	
6	Legal regulation of intellectual property	The goal is to form a holistic understanding of the system of legal regulation of intellectual property, including basic principles, mechanisms for protecting intellectual property rights and features of their implementation. The discipline covers the basics of IP law, including copyright, patents, trademarks, and industrial designs. Students learn how to protect and manage intellectual property rights, and consider legal disputes and methods for resolving them.	5																
7	Cadastre of populated places	The study of the discipline consists in the formation of competencies in the tasks of the method of accounting and control over the use of land, the principles of establishing boundaries and organizing territories of populated areas. Students will know the specifics of the processes of forming cadastral documentation, the stages of	4									**v**	**v**	**v**					

		developing plans and projects on the territory of settlements. The legal aspects and features of the cadastral assessment will be studied, taking into account the type of settlement, territorial zoning																	
8	Layout of populated places	Teaches students to understand the basic patterns of spatial development of cities and villages, urban planning legislation, norms and rules of urban planning and development; gives the student a systematic understanding of the placement of architectural objects in an urban environment. To study the prerequisites forming the functional and spatial framework of a populated place; the degree of detail of architectural and spatial solutions.	4						**v**									**v**	
Cycle of major disciplines University component																			
1	Basics of the cadastre	The purpose is to systematize and record information about real estate in a certain territory, create a unified database of land plots and real estate objects, their owners, restrictions and encumbrances.	5																

		To master the procedure for conducting cadastral activities that allow you to fill out basic land cadastre documents. To study the regulatory framework, legal acts regulating the processes of cadastral activity																	
2	Organization and planning of land cadastral works	To master the regulation of land relations and land use rights, calculation of the volume of land management works and drawing up the personnel balance; structuring the land resources system; creation of land management groups; payroll; calculation of labor income. To study the management of land management and cadastral works, cost estimates, cost calculation and acceptance of works, as well as accounting and monthly reporting on the amount of work performed.	5														v	v		v
3	Aerospace survey methods	Theoretical foundations of the application of aerospace survey methods to solve geodesy and cratography problems. The physical and geometric foundations of aerial surveys, platforms and sensors of space surveys of various ranges will be considered.	5								v	v	v					

		Students will gain skills in processing aerospace images using various software products, learn how to perform georeferencing of images, classify depicted objects, and create orthophotomaps, digital terrain and relief models.																	
4	Remote sensing of the earth	The purpose of the discipline is to master the methods of processing and analyzing satellite imagery data in solving cartographic, geodetic and environmental problems. Students will be able to understand the results of remote sensing of the Earth, use modern sensors operating in active and passive modes. They will master satellite imagery processing technology, including image enhancement and image interpretation methods, and learn how to select remote sensing data processing methods for solving geological and environmental problems.	6													v	v			v
5	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	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.																
6	Cadastral zoning, land valuation and taxation	To study the regulatory framework for cadastral valuation of land, to get an idea of zoning and taxation of land. To master the methods of zoning the territories of cities and rural settlements for the functional use of land. To master the issues of the organization of the state cadastral valuation of lands. Get an idea of the cadastral and market value of a land plot, the results and expertise of the cadastral value of land. To study the issues of dispute resolution on the results of determining the cadastral value of land.	5							v					v			

7	State registration and registration of lands	To study the basics of registration of ownership rights to real estate and transactions with it, patterns and prospects for the development of the unified accounting and registration system of the Republic of Kazakhstan. Be able to analyze legal relations and regulatory legal acts in the field of registration of rights and accounting of real estate, interpret and apply these acts; solve practical problems by applying regulatory legal acts in the field of accounting and registration actions. Have the skills to work with legal acts.	6								v	v	v					
8	Automated technologies for conducting cadastral works	The purpose of the course is to form students' knowledge about modern automated land information systems. After completing the course, the student must know the regulatory framework for regulating land relations of the Republic of Kazakhstan, the structure of land management and cadastral institutions, the processes of processing and integrating cadastral data between structural units, as well as be able to use modern	5														v	v	

		automated GIS systems to solve cadastral problems.																	
9	GIS in land management and cadastre	To gain theoretical knowledge and practical skills in the application of geoinformation technologies for work in the tasks of land management production. During the course, the student will master GIS software for the collection, storage, visualization and analysis of land management and cadastre data, the principles of formation and design of a geospatial database, the use of tools and algorithms for creating automation processes, integration of GIS and land information cadastral platforms	5													v		v	
10	Management of land management and cadastral works	To study the features of cadastral activity management 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 cadastre activities. To master the methodology of drawing up a business plan for the	5													v		v	

		organization of land management and cadastral enterprises. Master the methodology of planning and organizing cadastral works, as well as be able to perform calculations to optimize land management and cadastral works.																	
11	Land management design	Acquire theoretical knowledge and practical skills that allow you to master the methodology of land management design. To study the principles of land management, classification and content of land management projects. To know the assessment of the economic efficiency of design solutions, ways of organizing land use and land ownership, features of designing land holdings for various purposes. To master the principles of land management design, taking into account the conditions of different territories.	5															**v**	**v**
Cycle of major disciplines Selectable Component																			
1	Web-GIS basics	The discipline is focused on the formation of ideas and understandings about the concepts and technical	3																**v**

		foundations of web GIS, architecture and components of web GIS, thin and thick clients, types and functions of geospatial web services, optimization of web services, SDI in the web era, solving applied problems with using ArcGIS online and QGIS online. Creation of interactive online maps, “story maps” for solving problems in the field of geodesy, cartography, mine surveying.																	
2	Web-cartography	The concepts of map creation and map material design in a Web-oriented environment will be studied. The discipline is an alternative discipline to «Web-GIS basics». Gain skills in the use of the basics of computer networks and their mechanisms, and analyze the principles of GIS servers and JavaScript. Master the systems and algorithms of web architecture, in order to design and create interactive maps and web applications in the tasks of land management and cadastre.	3															**v**		**v**

5. Curriculum of the educational program

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.M. Begentaev
2024 y.

CURRICULUM
of Educational Program on enrollment for 2024-2025 academic year
Educational program 6B07310 - "Land management and cadastre"
Group of educational programs B075 - "Cadastre and land management"

Form of study: full-time | Duration of study: 4 years | Academic degree: Bachelor of Engineering and Technology

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	classroom volume of	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training hours and semesters							
								I course		II course		III course		IV course	
								1 semester	2 semester	3 semester	4 semester	5 semester	6 semester	7 semester	8 semester
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)															
M-1. Module of language training															
LNG 108	English language	GED, RC	5	150	0/0/3	105	E	5							
LNG 108	English language	GED, RC	5	150	0/0/3	105	E		5						
LNG 104	Kazakh (Russian) language	GED, RC	5	150	0/0/3	105	E	5							
LNG 104	Kazakh (Russian) language	GED, RC	5	150	0/0/3	105	E		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	GED, RC	5	150	2/1/0	105	E				5				
M-4. Module of socio-cultural development															
HUM 137	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	105	E			5					
M-5. Module of anti-corruption culture, ecology and life safety base															
HUM 136	Fundamentals of anti-corruption culture	GED, CCH	5	150	2/0/1	105	E								
MNG 489	Fundamentals of Entrepreneurship and Leadership														
HPP128	Scientific research methods														
CHE 656	Ecology and life safety														
CYCLE OF BASIC DISCIPLINES (BD)															
M-6. Module of physical and mathematical training															
MAT423	Mathematics	BD, CCH	5	150	1/0/2	105	E	5							
CHE495	General Chemistry	BD, CCH	5	150	1/1/1	105	E	5							
M-7. Module of basic training															
GEN 429	Engineering and computer graphics	BD, CCH	5	150	1/0/2	105	E	5							
MAP570	Topographic graphics	BD, CCH	3	90	0/0/2	75	E	3							
MAP536	Geodesy	BD, CCH	6	180	2/0/2	120	E		6						
MAP537	Cartography	BD, CCH	6	180	2/0/2	120	E			6					
M-8. The module of engineering and geodetic works															
MAP565	Theoretical foundations of land management and cadastre	BD, CCH	5	150	1/0/2	105	E			5					
MAP114	Geoinformatics	BD, CCH	5	120	1/0/2	75	E			6					
MAP490	Land management	BD, CCH	5	150	1/0/2	105	E								
MAP481	Geodetic instrumentation	BD, CCH	5	150	1/0/2	105	E								
MAP477	Digital mapping	BD, CCH	5	150	1/0/2	105	E								
MAP576	Land monitoring	BD, CCH	5	150	1/0/2	105	E								
MAP442	Geodetic works in land management	BD, CCH	5	150	1/0/2	105	E			5					
GIG136	Water resources management	BD, CCH	5	150	1/0/2	105	E				5				
MAP188	Land reclamation	BD, CCH													
MAP180	Landscape studies	BD, CCH	5	150	2/0/1	105	E							5	
MAP448	Estimation of land										5				
MAP191	State control of land use and protection	BD, CCH	5	150	1/0/2	105	E					5			
MAP402	Land reclamation and protection from erosion				1/0/2							5			
MAP496	Soil science	BD, CCH	5	150	1/0/2	105	E						5		
MNG562	Legal regulation of intellectual property				2/0/1										
MAP450	Soil bonification				1/0/2								5		
MAP183	Engineering arrangement of the territory	BD, CCH	5	150	1/0/2	105	E								
MAP561	Land law				1/0/2										
MNG563	Fundamentals of sustainable development and ESG projects in Kazakhstan				2/0/1										5
MAP559	Cadastre of populated places	BD, CCH	4	90	1/0/2	60	E								
MAP416	Layout of populated places				1/0/2										4
CIV784	Educational practice	BD, CCH	2						2						
CYCLE OF MAIN DISCIPLINES (PD)															
M-9. Professional activity module															
MAP476	The basics of the cadastre	PD, CCH	5	150	1/0/2	105	E			5					
MAP155	Photogrammetry	PD, CCH	5	150	1/0/2	105	E					5			
MAP569	Organization and planning of land cadastral works	PD, CCH	5	150	1/0/2	105	E					5			
MAP564	Cadastral zoning, land valuation and taxation	PD, CCH	5	120	1/0/2	75	E					5			
MAP483	Aerospace survey methods	PD, CCH	5	150	1/0/2	105	E						5		

MAP551	State registration and registration of lands	PD, CCH	6	180	2/0/2	120	E						6			
MAP458	Automated technologies for conducting	PD, CCH	5	150	1/0/2	105	E							5		
MAP567	GIS in land management and cadastre	PD, CCH	5	150	1/0/2	105	E							5		
MAP568	Management of land management and cadastral works	PD, CCH	5	150	1/0/2	105	E							5		
MAP425	Remote sensing of the earth	PD, CCH	5	150	1/0/2	105	E							5		
MAP420	Land management design	PD, CCH	5	150	2/0/1	105	E									5
MAP573	Basics of Web GIS	PD, CCH	3	120	0/0/2	75	E									3
MAP571	Web cartography				0/0/2											
AAP441	Production practice I	PD, CCH	2									2				
AAP406	Industrial practice II	PD, CCH	3										3			
	M-10, The module of final certification															
ECA109	Writing and defending a thesis (project)	FA	8													8
	M-11, Module of additional types of training															
AAP500	Military training	ATT	0													
	Total by UNIVERSITY:							30	30	30	30	30	30	30	30	
								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		97	14	176
PD	Cycle of profile disciplines		62	3	
	Total for theoretical training:				232
FA	final attestation	8			8
	TOTAL:				240

Decision of the Academic Council of KazNRTU named after K.Satpayev. Protocol № 12 от "22" 04 2024 y.

Decision of the Educational and Methodological Council of KazNRTU named after K.Satpayev. Protocol № 6 от "19" 04 2024 y.

Decision of the Academic Council of the Institute MMI **Protocol № 8 от "22" 04 2024 y.**

Vice-Rector for Academic Affairs — **R.K.Uskenbayeva**

Director Mining and Metallurgical Institute named after — **K.Rysbekov**

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

Specialty Council representative from employers — **A.Aimenov**