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

EDUCATIONAL PROGRAM
7M07324 - «Land management»

Code and classification of the field of education: **7M07 Engineering, Manufacturing and Civil engineering**
Code and classification of training areas: **7M073 Architecture and Civil engineering**
Group of educational programs: **M128 Land Management**
Level based on NQF: 7
Level based on IQF: 7
Study period: 2 years
Amount of credits: 120

Almaty 2025

Educational program 7M07324 – «Land management» was approved at a meeting of the Academic Council of KazNRTU named after K.I.Satbayev.
Protocol №6 of 6.03.2025
Considered and recommended for approval at a meeting of the Educational and Methodological Council of KazNRTU named after K.I.Satbayev.
Protocol №2 of 20.12.2024

Educational program 7M07324 – «Land management» developed by the academic committee in the direction of «Architecture and Civil engineering»

Full name	Academic degree/ academic title	Position	Place of work	Signature
Academic staff:				
Meirambek Guldana	PhD in Technical Sciences, Associate Professor	Head of Department of Surveying and geodesy	NPJSC «K.I. Satbayev Kazakh National Research Technical University»	
Zhakypbek Yryszhan	PhD, Associate Professor	Professor	NPJSC «K.I. Satbayev Kazakh National Research Technical University»	
Aitkazinova Shynar Kasymkanovna	PhD	Associate Professor	NPJSC «K.I. Satbayev Kazakh National Research Technical University»	
Employer:				
Mukhametov Yesen Serikovich	-	Acting Director	Almaty Regional Branch of RSE «GOSGRADCADASTR»	
Student:				
Iskakov Bolatbek Meirambekuly	-	1st year Doctoral Student	NPJSC «K.I. Satbayev Kazakh National Research Technical University»	

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List of abbreviations and designations

Reduction	Full name
SU	Satbayev University
MSHE RK	Ministry of Science and Higher Education of the Republic of Kazakhstan
AS	Academic staff
EP	Educational program
WC	Working curriculum
GIS	Geographic information system
LOED	Learning outcomes of the educational program
BD	Basic discipline
PD	Profile discipline
TUC	The university component
CC	Component of choice
SDG	Sustainable Development Goals
TUN	The United Nations

The educational program "Land Management" contributes to the achievement of the priority Sustainable Development Goals approved by the United Nations through the training of highly qualified specialists with competencies in the field of land relations regulation, cadastral registration, rational use and protection of land. Graduates of the program play a key role in ensuring the sustainable development of territories, effective management of land resources and legal protection of land ownership. The educational program contributes to the achievement of the following Sustainable Development Goals (SDGs):

SDG 4. Quality education is the formation of a sustainable system of high-quality, inclusive and affordable education that provides lifelong learning opportunities

SDG 9. Industrialization, innovation and infrastructure - the development of sustainable infrastructure and the introduction of scientific and technological innovations into the economy of the region and the country.

SDG 12. Responsible consumption and production is the development of a system of environmentally responsible consumption and production based on the principles of reduction, reuse and recycling.

SDG 13. Combating climate change – using geospatial technologies to monitor changes in the environment;

SDG 15. Conservation of terrestrial ecosystems is the monitoring and assessment of land use aimed at protecting and restoring natural ecosystems.

1. Description of the educational program

Land management is a system of measures to ensure compliance with the land legislation of the Republic of Kazakhstan aimed at regulating land relations, organizing the rational use and protection of land.

2. The purpose and objectives of the educational program

Goal EP: training of highly qualified scientific, technical and engineering

personnel, whose activities are aimed at solving complex problems in the field of land management, cadastre and land and property relations, capable of carrying out various design, production, technological, organizational and managerial activities at a high technical level in the public and private sector, in organizations of any form of ownership.

Tasks EP:

Task 1: The readiness of specialists for research and design work in the field of geodesy, cartography, geoinformatics, surveying and land management, including in related fields related to the selection of necessary research methods, modification of existing and development of new methods based on the objectives of a specific study.

Task 2: The readiness of specialists for production and technological activities that ensure the introduction of new digital developments at the local level.

Task 3: The readiness of specialists to search for and obtain new information necessary to solve professional tasks in the field of knowledge integration in relation to their field of activity, to actively participate in the activities of an enterprise or organization.

Task 4: The readiness of specialists for scientific, informational, ideological and problematic communications in the professional environment and in the audience of non-specialists with a clear and deep justification of their position, to engage in organizational, managerial and service activities, to be aware of the responsibility for making their professional decisions.

Task 5: The readiness of specialists for self-study and continuous professional development during the entire period of scientific or professional activity.

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 general education program and for its individual modules, disciplines or tasks.

The main task at this stage is to choose methods and means of evaluation for all types of control, with the help of which it is possible to effectively assess the achievement of the planned learning outcomes at the subject level.

4. Passport of the educational program

4.1. General information

№	Field name	Note
1	Code and classification of the field of education	7M07 Engineering, Manufacturing and Civil engineering
2	Code and classification of training directions	7M073 Architecture and Civil engineering
3	Educational program group	M128 Land management

4	Educational program name	7M07324 Land management
5	Short description of educational program	Land management is a system of measures to ensure compliance with the land legislation of the Republic of Kazakhstan aimed at regulating land relations, organizing the rational use and protection of land.
6	Purpose of EP	Training of highly qualified scientific, technical and engineering personnel, whose activities are aimed at solving complex problems in the field of land management, cadastre and land and property relations, capable of carrying out various design, production, technological, organizational and managerial activities at a high technical level in the public and private sector, in organizations of any form of ownership.
7	Type of EP	New EP
8	The level based on NQF	7
9	The level based on IQF	7
10	Distinctive features of EP	No
11	List of competencies of educational program	**General cultural competencies (GCC):** **GCC-1.** Ability to communicate effectively in Russian, Kazakh and a foreign language in a professional environment, including in the field of land and property relations. **GCC-2.** Teamwork skills and interaction with colleagues, government officials, citizens and customers in solving land management and cadastral tasks. **GCC-3.** The ability to make informed decisions in non-standard situations, critically evaluate information and propose sustainable solutions in the field of land use. **GCC-4.** Skills of self-organization, setting professional goals, time planning, and improving personal effectiveness. **General Professional Competencies (GPC):** **GPC-1**. Knowledge of the regulatory framework in the field of land management, cadastre, land monitoring and urban planning regulation. **GPC-2.** Knowledge of methods of cadastral, geodetic, cartographic and land management measurements. **GPC-3.** Skills in collecting, analyzing, and maintaining spatial data for the development of spatial planning schemes and land management projects. **GPC-4.** The use of remote sensing methods for monitoring land use and land conditions. **GPC-5.** Understanding the environmental, legal and engineering aspects of rational land use and protection of land resources. **Professional Competencies (PC):** **PC-1.** Development of land management and cadastral works projects, carrying out land assessment procedures and zoning of territories. **PC-2.** Organization and execution of cadastral surveys,

		land surveying and preparation of land management documentation. **PC-3.** Carrying out cadastral land assessment, forming cadastral maps and maintaining the relevance of cadastral data. **PC-4.** Analysis and interpretation of spatial information using geographic information systems (GIS). **PC-5**. Participation in the design, coordination and implementation of rational land use schemes at the state and local levels. **PC-6.** Preparation of reports, analytical reports and proposals for public authorities and private clients. **Digital Competencies (DC):** **DC-1.** Possession of specialized software for cadastre and land management: ArcGIS, QGIS, AutoCAD, MapInfo, Agisoft, ENVI, etc **DC-2.** Ability to work with digital maps, aerial photographs, satellite images, 3D models and GNSS data. **DC-3.** Knowledge of cadastral and spatial information databases, their administration and integration skills. **DC-4.** The use of Web cartography, Web-GIS and cloud platforms in land management, cadastral and monitoring activities.
12	Learning outcomes of educational program	1.Develop land management projects and schemes, territorial planning schemes, measures to study the state and protection of land, conduct land monitoring. Make optimal management decisions. 2.Apply modern computer technologies for automated design of production processes in the land cadastral industry. 3.Apply the skills of working with legal and regulatory acts regulating land relations, working with technical documentation for land management design and territorial planning. 4.Be able to analyze and apply modern computer technologies, including Web-based GIS for creating database management systems, analyzing mathematical processing methods, the ability to take creative initiative, prepare applications for inventions and industrial designs. Be able to analyze remote sensing data when monitoring changes in the natural environment and anthropogenic objects, in order to ensure the safe functioning of the population and sustainable economic growth of the country. 5.Apply the skills of professional functions in the land cadastre industry, the ability to manage and develop working projects in land management. 6.Conduct research and pedagogical work, improve the intellectual and general cultural level, improve the moral and physical development of one's personality in the competence of professional activity.

		7.Apply the skills to express your thoughts fluently and clearly in English and use them as a means of business communication at a professional level.
13	Education form	Full-time
14	Period of training	2 years
15	Amount of credits	120
16	Languages of instruction	Kazakh, Russian
17	Academic degree awarded	Master of Technical Sciences
18	Developers and authors	Department of MSaG

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

№	Name of the discipline	Brief description of the discipline	Number of credits	Generated learning outcomes (codes)						
				LR1	LR2	LR3	LR4	LR5	LR6	LR7
Cycle of basic disciplines University component										
1.	Foreign language (professional)	The course is aimed at studying the main problems of scientific knowledge in the context of its historical development and philosophical understanding, the evolution of scientific theories, principles and methods of scientific research in the historical construction of scientific paintings of the world. The discipline will help to master the skills of developing critical and constructive scientific thinking based on research on the history and philosophy of science. At the end of the course, undergraduates will learn to analyze the ideological and methodological problems of science and engineering and technical activities in building Kazakhstan's science and the prospects for its development.	3						v	
2.	History and philosophy of science	The subject of philosophy of science, dynamics of science, specifics of science, science and pre-science, antiquity and the formation of theoretical science, the main stages of the historical development of science, features of classical science, non-classical and post-non-classical science, philosophy of mathematics, physics, engineering and technology, specifics of	3							v

		engineering sciences, ethics of science, social and moral responsibility of a scientist and engineer.								
3.	Higher school pedagogy	The course is aimed at mastering the methodological and theoretical foundations of higher education pedagogy. The discipline will help to master the skills of modern pedagogical technologies, technologies of pedagogical design, organization and control in higher education, skills of communicative competence. At the end of the course, undergraduates learn how to organize and conduct various forms of organizing training, apply active teaching methods, and select the content of training sessions. Organize the educational process on the basis of credit technology of education.	3							v
4.	Psychology of Management	The course is aimed at mastering the tools for effective employee management, based on knowledge of the psychological mechanisms of the manager's activity. Discipline will help you master the skills of making decisions, creating a favorable psychological climate, motivating employees, setting goals, building a team and communicating with employees. At the end of the course, undergraduates will learn how to resolve managerial conflicts, create their own image, analyze situations in the field of managerial activity, as well as negotiate, be stress-resistant and effective leaders.	3							v

Cycle of basic disciplines Elective component										
6.	Automated methods of land research	This discipline includes theoretical and practical aspects of automated methods of Earth exploration using aerospace sensing, geoinformation modeling, integration of various methods for use in systematic geographical exploration of the earth and includes the following sections: methods and means of automated Earth exploration, direct, space, photomethods, combined methods and data processing	5		v			v		
7.	Geospatial data visualization	The discipline aims to master the methods and concept of visual representation of spatial data (SD) obtained as a result of geodetic and surveying measurements for making managerial and engineering decisions and includes the following sections: geovisualization in the context of points of view of related disciplines; geo-imaging; methods of visualization and representation of SD; interactive approaches to delineating the isosurface for geovisualization; multivariate mapping and classification; interpretation of spatial analysis results; Simulation of virtual environments ("True 3D", empirical research, VR/AR).	5		v			v		
8.	Spatial data infrastructure	The aim is to study the creation and development of a spatial data infrastructure that provides access to spatial data and its effective use. The study of the use of geodetic and cartographic methods in solving problems of	5		v			v		

		creating databases of spatial and temporal data, environmental monitoring. The study of GIS packages, spatial data sources for solving professional tasks.								
8.	Monitoring of urban lands	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 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 methods of land monitoring; using remote sensing data for urban land planning.	5					v		v
9.	Organization of scientific research	The discipline is aimed at introducing undergraduates to scientific knowledge, willingness and ability to conduct research activities in the field of land management and cadastre related to the selection of necessary research methods, conducting experimental research and analyzing their results using information technology, conducting research based on modern achievements of domestic and foreign scientists and opens the way to the introduction of new developments	5			v				
10.	Territorial planning and management	The study of the discipline is to ensure sustainable and balanced development of territories, including the development of	5			v				

		engineering, transport, and social infrastructure based on respect for the interests of citizens and the state. Undergraduates should gain theoretical knowledge about the spatial organization of territories and the formation of the territorial environment and master the methods of studying the existing spatial structure for making decisions on planning and managing the development of territories.								
11.	Intellectual property and research	The purpose of this course is to provide undergraduates with the knowledge and skills necessary to understand, protect and manage intellectual property (IP) in the context of scientific research and innovation. The course is aimed at training specialists who can effectively work with IP, protect the results of scientific research and apply them in practice	5							
12.	Sustainable development strategies	To train graduate students in sustainable development strategies to achieve a balance between economic growth, social responsibility, and environmental protection. Graduate students will study the concepts and principles of sustainable development, the development and implementation of sustainable development strategies, the evaluation of their effectiveness, and international standards and best practices. Cases and examples of successful sustainable development strategies are included.	5							
Cycle of profile disciplines University component										

13.	Urban development and planning	The course program is aimed at acquiring skills in territorial strategic planning and territorial development. The ability to effectively make management decisions in the organization and development of a territory, the use of a comprehensive analysis of territories, using modern geoinformation technologies to predict the development of territories, the development of planning documentation and management of administrative-territorial units.	5	v		v				
14.	Land management and land management design	The discipline aims to form the skills of undergraduates in organizing and conducting land management activities, planning and rational use of the land fund of the Republic of Kazakhstan. Principles of making schemes and plans, measures for streamlining boundaries, formation of land use, the order of work in inter-farm and on-farm land management, as well as a comprehensive approach to the development of land management projects will be studied.	5	v		v	v			
15.	Legal support of land management activities	The discipline aims to form the skills of undergraduates in organizing and conducting land management activities, planning and rational use of the land fund of the Republic of Kazakhstan. Principles of making schemes and plans, measures for streamlining boundaries, formation of land use, the order of work in inter-farm and on-farm land management, as well as a comprehensive approach to the development of land management projects will be studied.	5	v			v			
16.	Land use regulation	The study of the discipline consists in the	5	v			v			

	and land economy	formation of competencies in the tasks of land management, principles and systems of management of authorities, legislation and legal procedures related to the regulation of land use. Knowledge of the relationship between public sector planning and regulation and the economics of land and property. The undergraduate must be able to assess the role of the public sector in the land economy.								
17.	Modern problems of land management and cadastre	The course will present modern methods and methods of land management and organization of the use of a single land fund at various administrative and territorial levels, at enterprises and organizations of various branches of the national economic complex, receipt, collection and processing in the management of the cadastre.	5			v				v
18.	Remote sensing of the Earth and natural resources	The study of the theoretical foundations and practical skills of observing the Earth's surface by ground and remote methods. Formation of remote sensing data processing skills using modern software, classification and interpretation of the results obtained, correct design of the results and preparation of accounting documentation.	4							
19.	Land management expertise and regulatory legal acts of land relations	The study of the legal foundations of the regulation of land relations, the conduct of land management expertise, as well as the analysis and application of regulatory legal acts in the field of land use. Content. Introduction to land management expertise, the regulatory framework of land relations, the procedure of land management	3	v		v				

		expertise, state control and monitoring of land use, modern geographic information systems (GIS) and remote sensing of the earth in land management.								
20.	Strategic and system analysis in the development of territories	The study of methods of analysis and planning of territorial development, taking into account socio-economic, environmental and infrastructural factors. It builds strategic management, forecasting, and decision-making skills for the sustainable development of regions. Content. Fundamentals of strategic and system analysis, factors of territorial development, methods and tools of strategic analysis, strategic planning and forecasting, state regulation and management of territorial development.	3					v		v
21.	Monitoring of natural resources and environmental protection	The study of methods for assessing the state of natural resources, environmental monitoring systems and measures for their protection. It builds knowledge about environmental protection, modern monitoring technologies and principles of sustainable environmental management. Content. Introduction to the monitoring of natural resources, methods and systems of environmental monitoring, monitoring of various environmental components, environmental protection and rational use of natural resources, modern technologies and innovations in environmental monitoring.	3			v	v			
Cycle of profile disciplines Component of choice										
22.	Land management with	The purpose of mastering the discipline	5			v		v		

	the use of WEB-GIS	"Land management with the use of WEB-GIS" with the use of WEB-GIS is to form a holistic view of land use management in modern conditions, knowledge of the scientific and theoretical foundations of land use management in the amount provided for in the curriculum and necessary for solving production and research tasks using WEB-GIS technologies.								
23.	WEB-GIS	The study of theoretical and practical aspects of web GIS. Formation of ideas and understandings about the concepts and technical foundations of web GIS; exploring the possibilities of web GIS technologies using ESRI products (ArcGIS online, server) and open resources (QGIS, Mapserver, Geoserver); geospatial web services, geoportals, meshes, mobile GIS, creating interactive online maps for solving problems in the field of geodesy, cartography, surveying.	5			v		v		
24.	Sustainable business and project management	"Discipline ""Steady Business and Project Management"" for undergraduates is aimed at teaching the principles and methods of creating and managing sustainable business projects, including the development of sustainable development strategies and the use of project management tools in conditions of variability and uncertainty. Undergraduates master project management methodologies, develop risk analysis and assessment skills, and prepare to solve case studies and participate in practical projects related to	3							

		sustainable business. As a result of the training, they acquire the ability to develop strategies for sustainable business development, plan, monitor and complete projects, as well as analytical and practical skills for effective management of sustainable business projects."								
25.	Methodology of continuous career design in inclusive education	Objective: it is aimed at mastering the methodology of continuous quarry design in market conditions, taking into account existing and new methods of intensive construction, technical re-equipment, phased development of deposits, adjustments to the mining transportation system, reconstruction and operation of quarries	3							

5. Curriculum of the educational program

NON-PROFIT JOINT STOCK COMPANY
"KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY NAMED AFTER K.I. SATBAYEV"

SATBAYEV UNIVERSITY

«APPROVED»
Decision of the Academic Council
NPJSC«KazNRTU
named after K.Satbayev»
dated 06.03.2025 Minutes № 10

WORKING CURRICULUM

Academic year	**2025-2026 (Autumn, Spring)**
Group of educational programs	**M128 - "Land Management"**
Educational program	**7M07324 - "Land management"**
The awarded academic degree	**Master of Technical Sciences**
Form and duration of study	**full time (scientific and pedagogical track) - 2 years**

Discipline code	Name of disciplines	Block	Cycle	Total ECTS credits	Total hours	lek/lab/pr Contact hours	in hours SIS (including TSIS)	Form of control	Allocation of face-to-face training based on courses and semesters				Prerequisites
									1 course		2 course		
									1 sem	2 sem	3 sem	4 sem	
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)													
CYCLE OF BASIC DISCIPLINES (BD)													
M-1. Module of basic training (university component)													
LNG213	Foreign language (professional)		BD, UC	3	90	0/0/30	60	E	3				
HUM214	Psychology of management		BD, UC	3	90	15/0/15	60	E	3				
MAP293	Automated methods of land research	1	BD, CCH	5	150	30/0/15	105	E	5				
MNG782	Sustainable development strategies	1	BD, CCH	5	150	30/0/15	105	E	5				
MAP740	Urban development and planning	1	BD, CCH	5	150	15/0/30	105	R	5				
MAP277	Territorial planning and management	2	BD, CCH	5	150	15/0/30	105	E	5				
MNG781	Intellectual property and research	2	BD, CCH	5	150	30/0/15	105	E	5				
MAP739	Modern problems of land management and cadastre	2	BD, CCH	5	150	15/0/30	105	R	5				
HUM212	History and philosophy of science		BD, UC	3	90	15/0/15	60	E		3			
HUM213	Higher school pedagogy		BD, UC	3	90	15/0/15	60	E		3			
MAP713	Spatial data infrastructure	1	BD, CCH	5	150	15/0/30	105	E		5			
MAP214	Monitoring of urban land	1	BD, CCH	5	150	30/0/15	105	E		5			MAP112
MIN220	Methodology of continuous career design in inclusive education	1	BD, CCH	5	150	30/0/15	105	E		5			
MNG783	Sustainable Business and Project Management	1	BD, CCH	5	150	15/0/30	105	E		5			
M-3. Practice-oriented module													
AAP273	Pedagogical practice		BD, UC	8				R				8	
CYCLE OF PROFILE DISCIPLINES (PD)													
M-2.Module of professional activity (university component, component of choice)													
MAP276	Land use regulation and land economy		PD, UC	5	150	15/0/30	105	E	5				
MAP736	Land management expertise and regulatory legal acts of land relations		PD, UC	5	150	15/0/30	105	R	5				
MAP737	Monitoring of natural resources and environmental protection		PD, UC	5	150	15/0/30	105	R		5			
MAP238	Organization of scientific research		PD, UC	5	150	30/0/15	105	E		5			MAP138
MAP710	WEB-GIS	1	PD, CCH	5	150	15/0/30	105	E		5			

MAP712	Land management using WEB-GIS	1	PD, CCH	5	150	15/0/30	105	E		5			
M-3. Practice-oriented module													
MAP722	Legal support for land management activities		PD, UC	5	150	30/0/15	105	E			5		
MAP292	Land management and land management design		PD, UC	5	150	30/0/15	105	E			5		
MAP730	Geospatial data visualization		PD, UC	5	150	15/0/30	105	E			5		
MAP738	Strategic and system analysis in the development of territories		PD, UC	5	150	15/0/30	105	R			5		
AAP256	Research practice		PD, UC	4				R			4		
MAP741	Remote sensing of the Earth and natural resources/		PD, UC	4	120	30/0/15	75	E			4		
M-4. Experimental research module													
AAP268	Research work of a master's student, including internship and completion of a master's thesis		RWMS	4				R	4				
AAP268	Research work of a master's student, including internship and completion of a master's thesis		RWMS	4				R		4			
AAP251	Research work of a master's student, including internship and completion of a master's thesis		RWMS	2				R			2		
AAP255	Research work of a master's student, including internship and completion of a master's thesis		RWMS	14				R				14	
M-5. Module of final attestation													
ECA212	Registration and protection of the master thesis		FA	8								8	
Total based on UNIVERSITY:									30	30	30	30	
									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	0	0	0	0
BD	Cycle of basic disciplines	0	20	15	35
PD	Cycle of profile disciplines	0	48	5	53
Total for theoretical training:		**0**	**68**	**20**	**88**
RWMS	Research Work of Master's Student				24
ERWMS	Experimental Research Work of Master's Student				0
FA	Final attestation				8
TOTAL:					**120**

Decision of the Educational and Methodological Council of KazNRTU named after K.Satpayev. Minutes № 3 dated 20.12.2024

Decision of the Academic Council of the Institute. Minutes № 4 dated 12.12.2024

Signed:

Governing Board member - Vice-Rector for Academic Affairs — Uskenbayeva R. K.

Approved:

Vice Provost on academic development — Kalpeyeva Z. B.

Head of Department - Department of Educational Program Management and Academic-Methodological Work — Zhumagaliyeva A. S.

Director - Mining and Metallurgical Institute named after O.A. Baikonurov — Ryskekov K. .

Department Chair - Surveying and geodesy — Meiranbek G. .

Representative of the Academic Committee from Employers ____Acknowledged____ — Mukhametov Y.