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
NRK Level: 7
ORC Level: 7
Duration of training: 2 years
Volume of credits: 120

Almaty 202

NJSC "KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I. SATPAYEV"

Educational program 7M07324 - «Land management» was approved at a meeting of the Academic Council of KazNRTU named after K.I.Satpayev.
Protocol № 11 of 28.03.2023
Considered and recommended for approval at a meeting of the Educational and Methodological Council of KazNRTU named after K.I.Satpayev.
Protocol № 11 of 28.03.2023

Educational program 7M07324 - «Land management» developed by the academic committee in the direction of «Land management»

Full name	Academic degree/ academic title	Position	Place of work	Signature
Chairman of the Academic Committee:				
Kochetova M.A.		director	«Leica Geosystems Kazakhstan»	
Academic staff:				
Orynbassarova E.O.	PhD	head of department	SU	
Aitkazinova Sh.K.	PhD	associate professor	SU	
Nukarbekova Zh.M.	m.s.c.	senior lecturer	SU	
Employer:				
Narbaev M.M.		director	TOO «ALIGeo»	

F KazNRTU 703-05 Educational program

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List of abbreviations and designations

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

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	Field of education	7M07 Engineering, Manufacturing and Civil engineering
2	Direction of personnel training	7M073 Architecture and Civil engineering
3	Group of educational programs	M128 Land management
4	Educational program	7M07324 Land management
5	Brief 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.
6	EP purpose	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	EP type	New EP
8	Level on NQF	7
9	Level on SQF	7
10	EP distinctive features	No
11	List of competencies of the educational program:	7
12	The formed educational outcomes	1. Apply the skills of professional functions in the land cadastre industry, the ability to manage and develop work projects in land management. 2. Apply modern computer technologies for computer-aided design of production processes in the land cadastre industry. 3. To develop projects and schemes of land management, schemes of territorial planning, measures to study the condition and protection of land, to monitor land. Make

		optimal management decisions. 4. Apply skills of working with legal and regulatory acts regulating land relations, work with technical documentation of land management design and territorial planning. 5. Be able to analyze and apply modern computer technologies, including Web-based GIS to create database management systems, analyze mathematical processing methods, the ability to show creative initiative, prepare applications for inventions and industrial designs. 6. Apply the skills to express your thoughts freely and clearly in English and use it as a means of business communication at a professional level. 7. To carry out research and pedagogical work, to raise the intellectual and general cultural level, to improve the moral and physical development of one's personality in the competence of professional activity.
13	Form of training	Daytime
14	Duration of training	2 years
15	Volume of the credits	120
16	Languages of instruction	Kazakh, Russian
17	The awarded academic degree	Master
18	Developer(s) 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 designed for undergraduates of technical specialties to improve and develop foreign language communication skills in professional and academic fields. The course introduces students to the general principles of professional and academic intercultural oral and written communication using modern pedagogical technologies.	5						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 engineering sciences, ethics of science, social and moral responsibility of a scientist and engineer.	3							v
3.	Higher school pedagogy	The course is intended for undergraduates of the scientific and pedagogical magistracy of all specialties. As part of the course,	3							v

		undergraduates will master the methodological and theoretical foundations of higher school pedagogy, learn how to use modern pedagogical technologies, plan and organize learning and education processes, master the communicative technologies of subject-subject interaction between a teacher and a graduate student in the educational process of a university. Also, undergraduates study human resource management in educational organizations (using the example of a higher school).								
4.	Psychology of management	The discipline studies the modern role and content of psychological aspects in managerial activity. The improvement of the psychological literacy of the student in the process of implementing professional activities is considered. Self-improvement in the field of psychology and studying the composition and structure of management activities, both at the local level and abroad. The psychological feature of modern managers is considered.	3							v
Cycle of basic disciplines Elective component										
5.	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	5		v			v		

		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.								
6.	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**		
7.	Monitoring of urban land	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	5		**v**			**v**		

		observations monitoring the condition and use of the land fund; remote methods of land monitoring; using remote sensing data for urban land planning.								
8.	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				
9.	Spatial data infrastructure	Within the framework of studying the discipline, the master's student will master the concepts of designing and developing spatial data infrastructure, international and national standards for the implementation of IPD, database management systems, components of compatibility and exchange of multi-format data and their technical implementation in a GIS-oriented environment and geospatial services. The structures of data storage and management, organization of access will be studied.	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 engineering, transport, and social infrastructure based on respect for the interests of citizens and the state.	5		v			v		

		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.								
Cycle of profile disciplines University component										
11.	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**				
12.	Land management expertise	The discipline program is aimed at acquiring the skills of conducting land management expertise as a mandatory element in the system of land resources and real estate management. Undergraduates will study methods for determining the characteristics of land plots, determining the actual location and actual area of land plots, as well as other issues related to land plots.	5	**v**		**v**				
13.	Land use regulation and land economy	The study of the discipline consists in the formation of competencies in the tasks of	5	**v**		**v**	**v**			

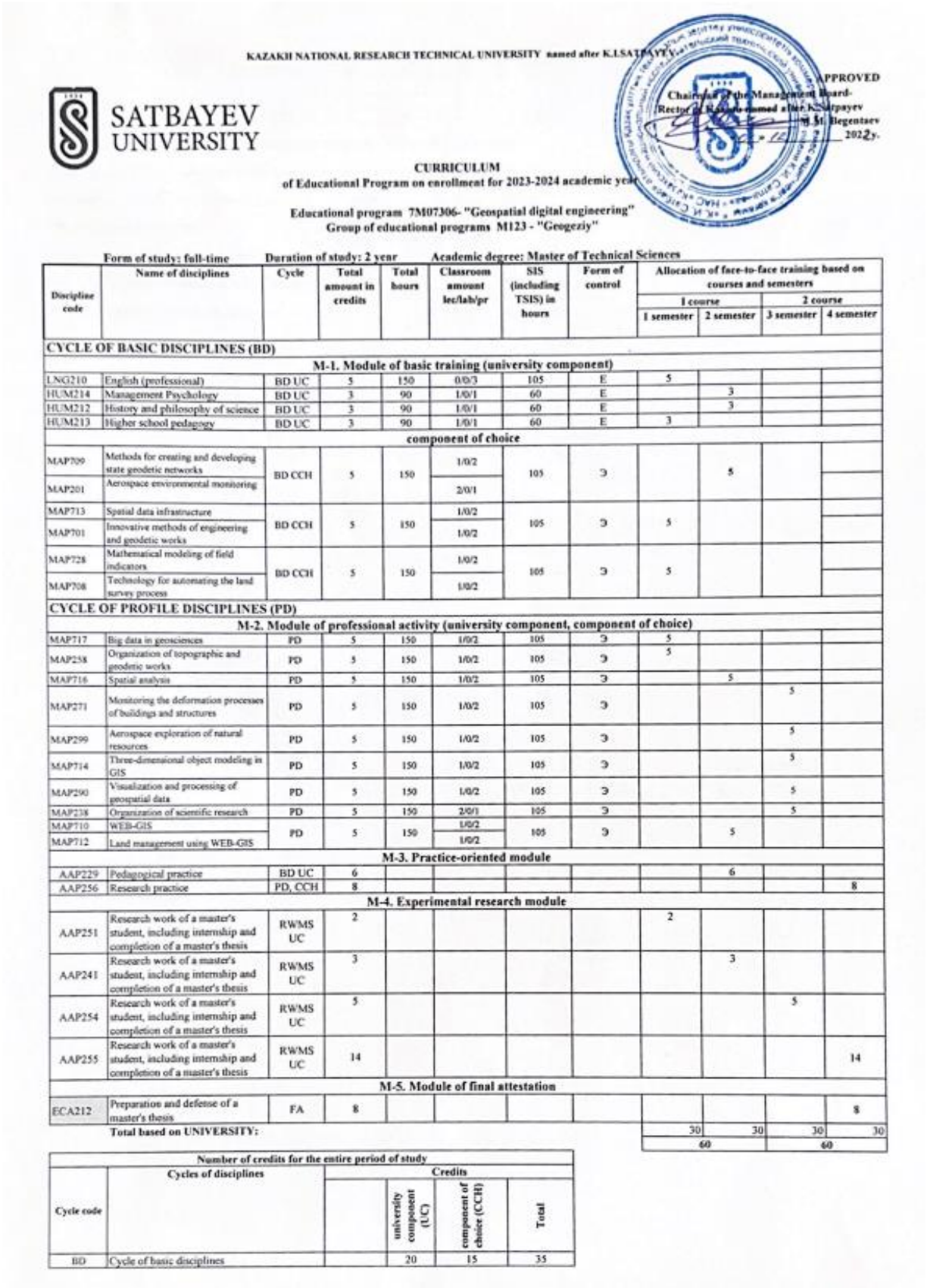
		land management, principles and systems of management of authorities, legislation and legal procedures related to the regulation of land use. Knowledge of the relationship between public sector planning and regulation and the economics of land and property. The undergraduate must be able to assess the role of the public sector in the land economy.								
14.	Legal support of land management activities	The course contains a training program aimed at studying the legal foundations of land management and cadastre. Undergraduates will know the specifics of the processes of forming a system for managing land relations, the application of regulations, methods of legal regulation of land and property relations, according to the Legislation of the Republic of Kazakhstan.	5	v			v			
15.	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	v		
16.	Spatial analysis	Spatial analysis allows you to solve complex location-oriented tasks, find patterns, evaluate trends and make decisions. The objectives of the discipline include the development of the theory of spatial analysis, the main theoretical aspects of constructing geographical images and	5					v		v

		features of solving model problems, methods of spatial analysis for various design stages and research tasks. The master's student will master the role of the spatial factor; prepare for research activities related to the study and numerical description of natural phenomena distributed in space; learn to model spatial data.								
17.	Territorial land use planning	The aim of the course "Territorial planning and management" is to develop master students' knowledge, skills and ideas necessary to solve problems in the spatial organization of the territory and the formation of planning projects for territorial units for the effective application of the acquired skills in practical activities. The ability to effectively make management decisions in the organization and development of a territory, the use of a comprehensive analysis of territories.	5	v			v			
18.	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
		The purpose of the course "Territorial	5			v	v			

		planning and management" is to develop the knowledge, skills and ideas necessary for undergraduates to solve problems in the spatial organization of the territory and the formation of planning projects of territorial units for the effective application of the acquired skills in practice. The ability to effectively make management decisions in the organization and development of the territory, the use of a comprehensive analysis of territories.								
Cycle of profile disciplines Component of choice										
19.	Land management with the use of WEB-GIS	The purpose of mastering the discipline "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.	5			**v**		**v**		
20.	WEB-GIS in subsurface use	This discipline is an alternative to the discipline of Web GIS and provides theoretical and practical knowledge about the concept and technical foundations of web GIS, geoportals, meshes, mobile GIS. Develops skills in using web GIS technologies to create, manage, and analyze databases on deposits, subsurface use licenses, mineral reserves, infrastructure, etc. using ESRI products (ArcGIS online,	5			**v**		**v**		

		server) and open resources (QGIS, Mapserver, Geoserver) as an example.								

5. Curriculum of the educational program



KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I.SATPAYEV

APPROVED
Chairman of the Management Board-
Rector of Kazakh National Research Technical University named after K.I. Satpayev
M.M. Begentaev
"12" 12 2022 y.

SATBAYEV UNIVERSITY

CURRICULUM
of Educational Program on enrollment for 2023-2024 academic year

Educational program 7M07306- "Geospatial digital engineering"
Group of educational programs M123 - "Geogeziy"

Form of study: full-time Duration of study: 2 year Academic degree: Master of Technical Sciences

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	Classroom amount lec/lab/pr	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training based on courses and semesters			
								1 course		2 course	
								1 semester	2 semester	3 semester	4 semester
CYCLE OF BASIC DISCIPLINES (BD)											
M-1. Module of basic training (university component)											
LNG210	English (professional)	BD UC	5	150	0/0/3	105	E	5			
HUM214	Management Psychology	BD UC	3	90	1/0/1	60	E		3		
HUM212	History and philosophy of science	BD UC	3	90	1/0/1	60	E		3		
HUM213	Higher school pedagogy	BD UC	3	90	1/0/1	60	E	3			
component of choice											
MAP709	Methods for creating and developing state geodetic networks	BD CCH	5	150	1/0/2	105	Э		5		
MAP201	Aerospace environmental monitoring				2/0/1						
MAP713	Spatial data infrastructure	BD CCH	5	150	1/0/2	105	Э	5			
MAP701	Innovative methods of engineering and geodetic works				1/0/2						
MAP728	Mathematical modeling of field indicators	BD CCH	5	150	1/0/2	105	Э	5			
MAP708	Technology for automating the land survey process				1/0/2						
CYCLE OF PROFILE DISCIPLINES (PD)											
M-2. Module of professional activity (university component, component of choice)											
MAP717	Big data in geosciences	PD	5	150	1/0/2	105	Э	5			
MAP258	Organization of topographic and geodetic works	PD	5	150	1/0/2	105	Э		5		
MAP716	Spatial analysis	PD	5	150	1/0/2	105	Э			5	
MAP271	Monitoring the deformation processes of buildings and structures	PD	5	150	1/0/2	105	Э				5
MAP299	Aerospace exploration of natural resources	PD	5	150	1/0/2	105	Э				5
MAP714	Three-dimensional object modeling in GIS	PD	5	150	1/0/2	105	Э				5
MAP290	Visualization and processing of geospatial data	PD	5	150	1/0/2	105	Э				5
MAP238	Organization of scientific research	PD	5	150	2/0/1	105	Э				5
MAP710	WEB-GIS	PD	5	150	1/0/2	105	Э				
MAP712	Land management using WEB-GIS				1/0/2				5		
M-3. Practice-oriented module											
AAP229	Pedagogical practice	BD UC	6						6		
AAP256	Research practice	PD, CCH	8								8
M-4. Experimental research module											
AAP251	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	2					2			
AAP241	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	3						3		
AAP254	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	5							5	
AAP255	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	14								14
M-5. Module of final attestation											
ECA212	Preparation and defense of a master's 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		
		university component (UC)	component of choice (CCH)	Total
BD	Cycle of basic disciplines	20	15	35

PD	Cycle of profile disciplines				53
	Total for theoretical training:	*0*	*20*	*15*	*88*
	RWMS				*24*
FA	Final attestation	8			8
	TOTAL:	8	20	15	120

Decision of the Academic Council of Kaznu named after K.Satpayev. Protocol № 3 27.10.2022 y.

Decision of the Educational and Methodological Council of Kaznu named after K.Satpayev. Protocol № 2 21. 10. 2022 y.

Decision of the Academic Council of the Institute_____, Protocol № 2 or "11" 10 2022 y.

Vice-Rector for Academic Affairs B.A.Zhautikov

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

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

Specialty Council representative from employers A.T.Aimenov