«Kazakh National Research Technical University named after K.I. Satpayev»
Institute of Metallurgy and Industrial Engineering named after O.A.Baykonurov
Chair «Mine surveying and geodesy»

EDUCATIONAL PROGRAM
Bachelor of Engineering and Technology in the educational program "6B07303, 6B07304 - Geospatial Digital Engineering"

2st edition
in accordance with the State Educational Standard of Higher Education 2018

Almaty 2021

СӘТБАЕВ УНИВЕРСИТЕТІ SATBAYEV UNIVERSITY

The program is compiled and signed by the parties:

From Satbayev university:

1. Director of the Mining and Metallurgical Institute — Rysbekov K.B.
2. Head of the Department of Mine Surveying and Geodesy — Orynbassarova E.O.
3. Chairman of the E&M Council of the Department — Nukarbekova Zh.M.

From employers:

1. President of the LLP "Leica Geosystems Kazakhstan" Kochetova M.A.

From the partner university (if available):

1. Michigan Technical University, PhD, Associate Professor R.Schultz

Approved at the meeting of the Educational and Methodological Council of Satbayev University Protocol No. 6 of 06/14/2021.

Qualification:
Level 6 of the National Qualifications Framework: B
074 Urban Planning, Construction Works and Civil Engineering
In 075 Cadastre and land management

Professional competence: Performance of production and technological types of professional activity; ability to work with geodetic, stereophotogrammetric devices and cartographic equipment; ability to perform mathematical processing of geodetic and photogrammetric measurements in a qualified manner.

surveying and geodesy

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1 Normative references

Table 1 - List of regulatory and other documents, references to which are present in the document

№	Title of document	Storage link
1	The Law of the Republic of Kazakhstan "On Education" with amendments and additions within the framework of legislative changes to increase the independence and autonomy of universities from 04.07.18, No. 171-VI	Office Registrar (OR) http://online.zakon.kz/Document/?doc_id=30118747
2	State compulsory standard of higher education (Appendix 7 to the order of the Minister of Education and Science of the Republic of Kazakhstan dated 31.10.18, No. 604	OR http://online.zakon.kz
3	European Qualifications Framework for Higher Education	OR http://ecahe.eu/w/images/7/76/A_Framework_for_Qualifications_for_the_European_Higher_Education_Area.pdf
4	Dublin descriptors	http://ecahe.eu/w/index.php/Dublin_Descriptors
5	GOST 3.1105-2011 Unified system for technological documentation (ESTD). Forms and rules for drawing up general documents	http://online.zakon.kz/document/?doc_id=31194118
6	Satbayev University regulatory documents	Internal Audit Department
7	National qualifications framework Astana, 2016	https://atameken.kz/uploads/content/files/Национальная рамка квалификаций_2016.pdf
8	Professional standard "Geological exploration and topographic and geodetic works"	https://atameken.kz/uploads/content/files/Геологоразведочные и топографо-геодезические работы.pdf
9	Educational Program "Geospatial Digital Engineering"	https://official.satbayev.university/download/document/17466/Нефтяная инженерия ру 2018.pdf

2 Abbreviations used. Terms and Definitions

Table 2 - Abbreviations used

Abbreviations	Full name
ECTS	European credits accumulation and transfer system
SU	NJSC Satbayev university
MES RK	Ministry of Education and Science of the Republic of Kazakhstan
PTS	Professor-teaching staff

EP	Educational program
OR	Office Registrar
WCP	Working curriculum plan EP

Table 3-Terms and definitions used in the document text

Term	Definition
Bachelor's degree (1st Cycle)	The level of higher professional education with the award of the academic degree "bachelor"
Bachelor (Bachelor)	Academic degree awarded to individuals who have completed a bachelor's degree program
Dublin descriptors (Dublin descriptors)	An integral part of the European framework for higher education qualifications describing the degree of development of competencies
Competencies (Competency)	The ability of students to apply the knowledge, skills and abilities acquired in the course of training in professional activities
Control (Audit)	Qualitative characteristics of the student assessment system
Credit technology of education (Credit Education)	Learning based on the choice and self-planning of the student learning sequence of disciplines using credit as a unified unit of measurement of the volume of educational work of the student and teacher
Matrix of Competencies (Matrix of Competencies)	Based on Dublin descriptors describing the depth of competence development within the EP
Modular training (Cycle)	Segment of mastering and the depth of mastering by a student of competencies with an intermediate completed cycle
Educational program or EP (Curriculum)	Description of the educational process based on the achievements of learning outcomes and competencies for obtaining a recognized diploma in a specific area of professional activity
Learners (students)	Persons enrolled in the undergraduate program
Assessment (Assessment)	Quantitative characteristics of the student's assessment system
Applied Bachelor general engineering (Associate Degree, Short Cycle)	Completion of the minimum undergraduate degree with at least 124 credits of theoretical study
Working curriculum plan (Curriculum)	A document containing a complete list of academic disciplines of a compulsory component and an optional component, indicating the number of credits, the sequence of study of disciplines, types of training and forms of control
Framework of Competencies (Framework of Competencies)	Based on Dublin descriptors describing the depth of competence development
Outcome results (Outcome results)	Knowledge, abilities, skills, qualifications, competence
Sub-competency (Sub-competency)	The ability of students to apply the knowledge, skills and abilities acquired in the learning process within the framework of a certain competence
Graduate (Graduate)	Persons from among the students (students) who have successfully mastered the full theoretical course of study

3 BRIEF DESCRIPTION OF THE PROGRAM

The educational program **"Geospatial Digital Engineering"** is a first-level qualification of three levels of the higher education system. Due to the qualification module and final qualification work of bachelors of the educational program **"Geospatial Digital Engineering"**, the basis is created for the subsequent master's program, and then the doctoral program. Some of the graduates, having received the qualification "Bachelor", are directly involved in labor activities as line personnel in civil and industrial construction, the military-industrial complex, state bodies in the field of land management, design and survey institutes, bureaus, firms performing topographic and geodetic , aerial photogrammetric, engineering and survey and mapping works. "Bachelor" is considered mainly as an intermediate stage and a prerequisite for the transition to a further cycle of higher education under the "Master" program. Graduates of the bachelor's degree of the university have the opportunity to continue their studies in the master's degree in the received or related specialty on a grant or fully paid basis.

Mission of the educational program of specialties: 5B071100 - "Geodesy and Cartography"; 5B090300 - "Land management"; 5B090700 - "Cadastre" is to ensure the qualitative growth of the region's human capital in the field of geodesy and cartography, mine surveying, cadastre and land management, through the development of an innovative, scientific and educational environment and training, in accordance with the needs of the market, highly qualified personnel with high personal and professional competencies.

Geodesy is a modern, science-intensive and dynamically developing branch of the economy of the Republic of Kazakhstan. The ability to take into account changes in these trends is incorporated in the formulations of the goals of the educational program. Over the past 10-15 years, geospatial technologies have undergone dramatic qualitative transformations. Innovative technologies have come to the fore to ensure the most efficient collection and processing of geospatial data, primarily at the global level of spatial coverage. The professional community refers to such technologies as geoinformatics (GIS); airborne and space-based remote sensing of the Earth (ERS), including laser scanning; global

navigation satellite systems (GNSS). Traditional sectors of the economy in the field of geospatial technologies - geodesy and cartography - have lost their monopoly position in the market of geodata providers and are mainly solving the problems of cartographic and geodetic provision of state needs in basic spatial data. At the same time, the influence of new geospatial technologies on cartographic and geodetic production is sometimes revolutionary. This is especially true for the use of GNSS for solving applied problems of geodesy.

The role and place of new geospatial technologies in the life of modern society are such that geoinformatics and remote sensing data are already firmly identified as sectors of the economy that have scientific, technological and production components. It is obvious that the components of the new geospatial sectors of the economy are clearly inter-sectoral and interdisciplinary in nature. That is, the most favorable environment for the search for new areas of scientific research is provided.

Goals and objectives of the EP "Geospatial Digital Engineering":

Preparing a graduate for organizational activities, excluding negative phenomena in professional activity, the development of spiritual values, moral and ethical standards of the individual, as a member of society, the implementation of the legal and legislative system of the Republic of Kazakhstan with a high level of professional culture, civic position;

- Preparing a graduate for activities for continuous self-improvement and self-development, mastering new knowledge, skills and abilities in innovative areas of geodesy and cartography;
- Preparation of a graduate with acquired competencies for performing calculations of elements of geodesy and cartography, design of technical solutions, participation in the development of technical specifications for topographic and geodetic, aerospace, cartographic work based on a modern educational material and technical base;
- Preparation of a graduate competent in production management, design and engineering, organizational, technological and scientific and pedagogical directions, based on modern teaching aids of information technology and resources;
- Preparation of a graduate, based on the diversity and dynamism of the catalog of elective disciplines of the curriculum, with a predominance of practical skills in competencies, capable of performing professional functions within one or more types of activities based on the final learning outcomes, taking into account the specifics of these types of activities, market requirements for organizational and management , professional competencies;

Preparation of a graduate as a competitive specialist in the field of geodesy and cartography, including on the basis of increasing the international aspect in educational, scientific programs, competent in the field of advanced technologies of geodesy, cartography, land management, mine surveying and cadastre of implementation, and registration of the results of scientific research.

4 Requirements for applicants

Admission to a university is carried out according to the applications of an applicant who has completed in full secondary, secondary specialized education on a competitive basis in accordance with the points of the certificate issued based on the results of a single national test with a minimum score of at least 65 points, including at least 5 points - in the history of Kazakhstan, mathematical literacy, reading literacy - the language of instruction, and at least 5 points in each profile subject.

Special requirements for admission to the program apply to graduates of 12 summer schools, colleges, applied bachelor's programs, NIS, etc. Such applicants must pass diagnostic testing in English, mathematics, physics and special disciplines.

Table 2 - Rules for credit transfer for accelerated (reduced) education based on 12-year secondary, secondary technical and higher education

Code	Competency type	Description of competence	Competence Result	Responsible
GENERAL (This implies full training with possible additional training depending on the level of knowledge)				
G1	Communicativeness	- Fluent monolingual oral, written and communication skills - the ability to not fluently communicate with a second language - Ability to use communicative communication in various situations - there are the basics of academic writing in the native language - diagnostic test for language level	Full 4-year study with a minimum of 240 academic credits (of which 120 contact classroom academic credits) with a possible transfer of credits in a second language where students have an advanced level. The level of the language is determined by passing a diagnostic test	Chair of Kazakh and Russian languages, Department of English

G2	Mathematical literacy	- Basic mathematical thinking at the communication level - the ability to solve situational problems based on the mathematical apparatus of algebra and the beginnings of mathematical analysis - diagnostic test for mathematical literacy in algebra	Full 4-year study with a minimum of 240 academic credits (of which 120 contact classroom academic credits). With a positive passing of the diagnostic test, the level of Mathematics is 1, with a negative - the level of Algebra and the beginning of the analysis	Chair of Math
G3	Basic literacy in science disciplines	- basic understanding of the scientific picture of the world with an understanding of the essence of the basic laws of science - understanding of basic hypotheses, laws, methods, formulation of conclusions and estimation of errors	Full 4-year study with a minimum of 240 academic credits (of which 120 contact classroom academic credits). With a positive passing of the diagnostic test, the level of Physics 1, General Chemistry, with a negative - the level of the Beginning of Physics and Basic Foundations of Chemistry	Chair in natural sciences
SPECIFIC (implies reduced education through credit transfer depending on the level of knowledge in competencies for graduates of 12-year schools, colleges, universities, including humanitarian and economic areas)				
S1	Communicativeness	- Fluent bilingual oral, written and communication skills - ability not fluent communication with a third language - skills of writing text of different style and genre - skills of deep understanding and interpretation of one's own work of a certain level of complexity (essay) - basic aesthetic and theoretical literacy as a condition for full perception, interpretation of the original text	Full credit transfer by language (Kazakh and Russian)	Chair of Kazakh and Russian languages
S2	Mathematical literacy	- Special mathematical thinking using induction and deduction, generalization and concretization, analysis and synthesis, classification and systematization, abstraction and analogy - the ability to formulate, substantiate and prove provisions - application of general mathematical concepts, formulas and extended spatial perception for mathematical problems - a complete understanding of the basics of mathematical analysis	Credit transfer for the discipline Mathematics (Calculus) I	Chair of Math
S3	Special literacy in natural sciences (Physics, Chemistry, Biology and Geography)	- Broad scientific perception of the world, offering a deep understanding of natural phenomena - critical perception for understanding scientific phenomena of the	Credit transfer for Physics I, General Chemistry, General Biology, Introduction to Geology, Introduction to Geodesy; Study practice, etc.	Chair in natural sciences

		surrounding world - cognitive ability to formulate a scientific understanding of the forms of existence of matter, its interaction and manifestations in nature		
S4	English language	- readiness for further self-study in English in various fields of knowledge - willingness to gain experience in design and research work with the use of English	Transfer of English credits above academic to professional level (up to 15 credits)	Chair of English
S5	Computer skills	- Basic programming skills in one modern language - use of software and applications for training in various disciplines -existence of a global standard of language level certificate	Transfer of credits for the discipline Introduction to Information and Communication Technologies, Information and Communication Technologies	Chair of Software Engineering
S6	Social and humanitarian competences and behavior	- understanding and awareness of the responsibility of each citizen for the development of the country and the world - Ability to discuss ethical and moral aspects in society, culture and science	Recalculation of credits on the Modern History of Kazakhstan (excluding the state examination)	Chair of Social Disciplines
		- Critical understanding and ability for polemics for debating on modern scientific hypotheses and theories	Recalculation of credits in philosophy and other humanitarian disciplines	
PROFESSIONAL (implies reduced training due to credit transfer depending on the level of knowledge in competencies for graduates of colleges, AV schools, universities, including humanitarian and economic areas)				
P1	Professional competence	- critical perception and deep understanding of professional competencies at level 5 or 6 - Ability to discuss and argue on professional issues within the framework of the mastered program	Credit transfer for basic professional disciplines, including basics of mineral processing, ore preparation processes and equipment, theory of metallurgical processes I-II, gravity dressing methods	Graduating Chair
P2	General engineering competencies	- basic general engineering skills and knowledge, the ability to solve general engineering problems and problems - be able to use software packages for processing experimental data, solving systems of algebraic and differential equations	Credit transfer for general engineering disciplines (Engineering Graphics, Descriptive Geometry, Electrical Engineering Fundamentals, Thermodynamics Fundamentals)	Graduating Chair
P3	Computer engineering competence	- basic skills of using computer programs and soft systems for solving general engineering problems	Credit transfer for the following computer graphics disciplines, CAD fundamentals, CAE fundamentals, etc.	Graduating Chair
P4	Engineering and working competencies	- skills and abilities to use technical means and experimental devices for solving general engineering problems	Transfer of credits for academic disciplines of the experimental direction: general chemistry, crystallography and mineralogy, metallurgical engineering, metallurgy of heavy and light	Graduating Chair

			metals, metallurgy of secondary raw materials, heat and power engineering of metallurgical processes, technology of metallurgical production, metallurgical heat engineering, flotation methods of concentration, etc. .P.	
P5	Socio-economic competence	- Critical understanding and cognitive ability to reason on contemporary social and economic issues - Basic understanding of the economic assessment of objects of study and the profitability of industry projects	Recalculation of credits in socio-humanitarian and technical and economic disciplines in the offset of the elective cycle	Graduating Chair

The university may refuse to transfer credits if a low diagnostic level is confirmed or the final grades in completed disciplines were below A and B.

5 Requirements for completing studies and obtaining a diploma

Description of the compulsory standard requirements for graduation and the assignment of an academic bachelor's degree: mastering at least 240 academic credits of theoretical training and final thesis.

Special requirements for graduation under this program The student must have a general understanding of the topic of the thesis research plans, and contact potential academic advisors one year before the expected completion of the studies;

To get acquainted with potential scientific advisers and speed up the choice of topics for the thesis (project) by students, a review meeting is held one year before the expected completion of studies …;

To collect the necessary data and study urgent tasks, methods

1) procedures on the topic of thesis, the student undergoes industrial practice;

Upon completion of the internship, the student contacts the supervisor in writing or orally and reports on the results of the work, but not more than a week after the start of the 4th year of study;

1) within 4 weeks after the start of studies, the student and the leader must discuss and decide on the type (research, project or independent study) and topic of the thesis. This is an extremely important discussion and decision, since further change in the topic and type of work is impossible;

The topic of the thesis (project) and the scientific advisor are assigned to a student or a group of students no more than six weeks after the start of the final year of study and is approved by order of the rector of the higher educational institution.

6 Working curriculum plan of the educational program

SATBAYEV UNIVERSITY

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

APPROVED
Vice-Rector of KazNRTU named after K.SATPAYEV
_____ Begentaev
"__" _____ 2021

MAJOR CURRICULUM

of the educational program for recruitment for 2021-2022 academic year
Educational program 6B07303 - "Geospatial digital engineering"
Group of Educational programs B074-Urban planning, construction and civil engineering

Form of study: Full | Duration of training: 4 years | Academic degree: Bachelor of engineering and technology

Year of study	Code	Name of disciplines	Cycle	The total amount of credits	Total hours	classroom contact hrs./lab/prac	SRS (including SRDS) in hours	prerequisite	Code	Name of disciplines	Cycle	The total amount of credits	Total hours	classroom contact hrs./lab/prac	SRS (including SRDS) in hours	prerequisite
		1 semester								**2 semester**						
1	LNG108	English	G	5	150	0/0/3	105	Diagnost. Test	LNG108	English	G	5	150	0/0/3	105	
	LNG104	Kazakh (Russian) language	G	5	150	0/0/3	105	Diagnost. Test	LNG104	Kazakh (Russian) language	G	5	150	0/0/3	105	
	CHE494	Chemistry	B	5	150	1/1/1	105		HUM100	Modern history of Kazakhstan (state exam)	G	5	150	1/0/2	105	
	PHY488	Physics	B	5	150	1/1/1	105		MAT102	Mathematics II	B	5	150	1/0/2	105	
	MAT101	Mathematics I	B	5	150	1/0/2	105		MAP453	Geodesy (Introduction to the specialty)	B	8	240	2/0/2	180	
	GEN177	Engineering and computer graphics	B	5	150	1/0/2	105		HUM128	Political science	G	2	60	1/0/0	45	
	HUM129	Culturology	G	2	60	1/0/0	45		KPK102	Physical education II	B	2	60	0/0/2	90	
	KPK101	Physical education I	G	2	60	0/0/2	30									
		Total:		**34**						**Total:**		**32**				
		3 semester								**4 semester**						
2	HUM132	Philosophy	G	5	150	1/0/2	105		CSE677	Information and Communication Technologies (eng)	G	5	150	2/1/0	105	
	HUM122	Psychology	G	2	60	1/0/0	45		HUM127	Sociology	G	2	60	1/0/0	45	
	NNG487	Fundamentals of Entrepreneurship, Leadership and Anti-Corruption Culture	G	3	90	1/0/1	60		CHE452	Ecology and sustainable development	G	2	60	1/0/0	45	
	CHE451	Life safety	G	2	60	1/0/0	45		MAP477	Digital mapping	B	5	150	2/1/0	105	
	MAP475	Engineering geodesy	B	5	150	2/1/0	105		MAP478	Theory of mathematical processing of geodetic measurements	B	5	150	1/0/2	105	
	MAP474	Cartography	B	5	150	2/1/0	105		MAP479	Higher geodesy	B	5	150	2/1/0	105	
	MAP476	Basics of the cadastre	P	5	150	2/1/0	105		MAP155	Photogrammetry	P	5	150	1/0/1	105	
	KPK103	Physical education III	G	2	60	0/0/2	90		KPK104	Physical education IV	G	2	60	0/0/2	90	
		Total:		**29**						**Total:**		**31**				
		5 semester								**6 semester**						
3	MAP488	Organization and planning of land cadastre works	B	5	150	1/0/2	105		MAP482	Gravimetry	B	5	150	2/1/0	105	
	MAP114	Geoinformatics	B	5	150	1/0/2	105		MAP466	Web- Cartography	B	5	150	1/0/2	105	
	MAP481	Geodetic instruments	B	5	150	1/0/2	105		MAP483	Aerospace survey methods	P	5	150	2/1/0	105	
	MAP198	Fundamentals of digital photogrammetry	P	5	150	1/0/2	105		MAP495	Basics of laser scanning	P	5	150	2/1/0	105	
	SAF110	Labor protection	B	5	150	1/0/2*	105			Elective	B	5	150	2/1/0	105	
		Elective	B	3	90	1/0/1	60			Elective	P	5	150	2/1/0	105	
		Total:		**28**						**Total:**		**30**				
		7 semester								**8 semester**						
4	MAP485	Global navigation satellite systems	P	5	150	2/1/0	105			Elective	P	5	150	2/1/0	105	
	MAP425	Remote sensing of the earth	P	5	150	2/1/0	105			Elective	P	5	150	2/1/0	105	
	MAP486	Automation of topographic and geodetic works	P	5	150	1/0/2	105		ECA008	Graduate thesis (project) preparation*	FA	6				
		Elective	B	5	150	2/1/0	105		ECA103	Graduate thesis (project) defense*	FA	6				
		Elective	P	2	60	0/0/2	30									
		Total:		**22**						**Total:**		**22**				

Year of study	Code	Name	Cycle	Credits	semester
		Compulsory types of training with P/NP grade			
1	AAP101	Educational practice (B)	B	2	2
2	AAP141	Industrial internship I (P)	B	4	4
3-4	AAP178	Industrial internship II (P)	P	8	8
		Additional types of training			
1	AAP107	Sports club-sectional	G	0	1-7
2-3	AAP500	Military training	G	0	3-6

The number of credits for the entire period of study

Discipline cycles	Credits: obligatory	additional		Total
Cycle of general education disciplines (G)	58			58
Cycle of basic disciplines (B)	88	24		112
Cycle of profiling disciplines (P)	40	20		60
Total of theoretical training:	186	44		230
Final attestation (FA)	12	0		12
Total:	228	64		242

Decision of the Academic Council of KazNRTUKazNRTU named after K.SATPAYEV. Protocol No. 3 dated "25" 06 2021

Decision of the Educational and Methodological Council of KazNRTU named after K.SATPAYEV. Protocol No. 4 dated "___" january 2021

Decision of the Academic Council of the Institute of _____. Protocol No. ___ dated "___" _____ 2021

Vice-Rector for Academic Affairs B.A.Zhautikov

Director of the Institute of Geology, Oil and Mining named after K. Turysov A. Syzdykov

Head of the Chair of "Mine Surveying and Geodesy" E.O. Orynbassarova

Specialty Council Representative Zh. Malchubaev

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

SATBAYEV UNIVERSITY

APPROVED
Director of the Institute of Geology, Oil and Mining named after K. Turysov
_____ A.Kh. Syzdykov
«__» _____ 20

ELECTIVE DISCIPLINES for recruitment for 2021-2022 academic year

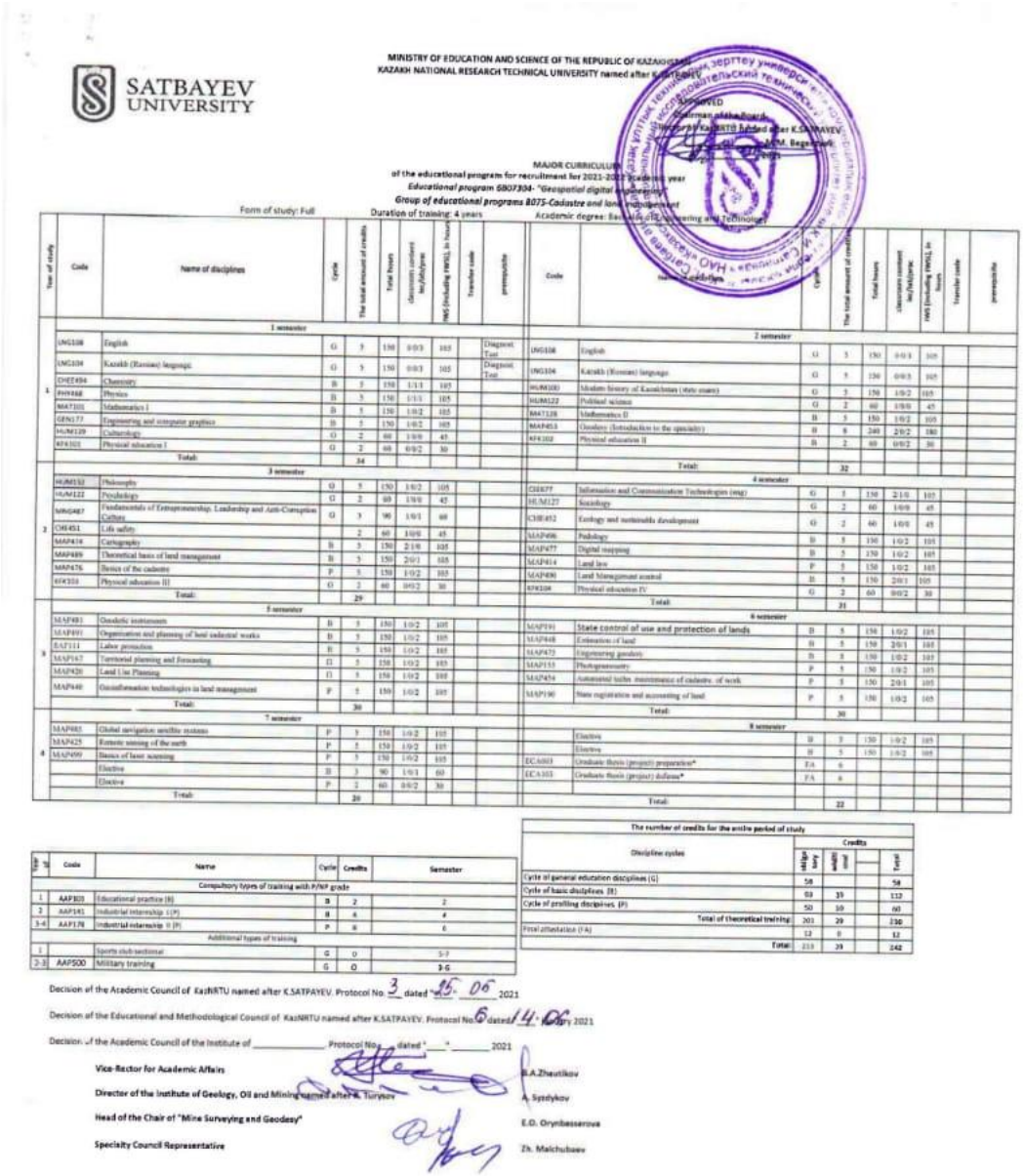
CURRICULUM OF THE EDUCATIONAL PROGRAM for recruitment for the 2021-2022 academic year
Educational program 6B07303 - "Geospatial digital engineering"
Group of Educational programs 8074-Urban planning, construction and civil engineering

Year of study	Elective code	Discipline Code	Name of disciplines	Cycle	credit	Total hours	lec/lab/prac	SWS (including SIWS) in hours	Prerequisite
5 semester									
3		MAP121	Engineering and geodetic survey	B	3	90	1/0/1	60	
		MAP501	Engineering surveying linear structures						
		Total:			3				
6 semester									
		MAP115	Geoinformation cartography	B	5	150	1/0/2	105	
		MAP473	Information technology in geodesy and remote sensing						
		MAP498	Applied geodesy	B	5	150	1/0/2	105	
		MAP484	Cartometry and mathematical cartography						
		Total:			10				
4	7 semester								
		MAP467	Geodetic works at industrial sites of mines and quarries	B	5	150	1/0/2	105	
		MAP422	Fundamentals of environmental mapping						
		MAP148	Web-GIS basics	P	2	60	0/0/2	30	
		MAP159	Computer design of projects and maps						
		Total:			5				
	8 semester								
		MAP467	Geodetic support for the construction of unique buildings and structures	P	5	150	1/0/2	105	
		MAP422	Thematic mapping						
		MAP148	Applied photogrammetry	P	5	150	1/0/2	105	
		MAP159	Economics and management of topogeodetic production						
		Total:			10				

The number of credits in elective disciplines for the entire period of study	
Discipline cycles	**Credits**
Cycle of general education disciplines (G)	0
Cycle of basic disciplines (B)	18
Cycle of profiling disciplines (P)	12
TOTAL:	30

Decision of the Academic Council of the Institute of Geology, Oil and Mining named after K. Turysov. Protocol No. ___ dated "___" _____2021

Head of the Chair of "Mine Surveying and Geodesy" **E.O. Orynbaserova**



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

APPROVED
Chairman of the Board
Rector of KazNRTU named after K.SATBAYEV
_____ A.M. Begentayev
"___" _____ 2021

MAJOR CURRICULUM
of the educational program for recruitment for 2021-2022 academic year
Educational program 6B07304- "Geospatial digital engineering"
Group of educational programs B075-Cadastre and land management
Form of study: Full Duration of training: 4 years Academic degree: Bachelor of Engineering and Technology

Year of study	Code	Name of disciplines	Cycle	The total amount of credits	Total hours	classroom content lec/lab/prac	SWS (including TWS), in hours	Transfer code	prerequisite
		1 semester							
1	LNG108	English	G	5	150	0/0/3	105		Diagnost. Test
	LNG104	Kazakh (Russian) language	G	5	150	0/0/3	105		Diagnost. Test
	CHE404	Chemistry	B	5	150	1/1/1	105		
	PHY468	Physics	B	5	150	1/1/1	105		
	MAT101	Mathematics I	B	5	150	1/0/2	105		
	GEN177	Engineering and computer graphics	B	5	150	1/0/2	105		
	HUM129	Culturology	G	2	60	1/0/0	45		
	KPA101	Physical education I	G	2	60	0/0/2	30		
		Total:		34					
		2 semester							
	LNG108	English	G	5	150	0/0/3	105		
	LNG104	Kazakh (Russian) language	G	5	150	0/0/3	105		
	HUM100	Modern history of Kazakhstan (state exam)	G	5	150	1/0/2	105		
	HUM122	Political science	G	2	60	1/0/0	45		
	MAT128	Mathematics II	B	5	150	1/0/2	105		
	MAP453	Geodesy (introduction to the specialty)	B	8	240	2/0/2	180		
	KPA102	Physical education II	B	2	60	0/0/2	30		
		Total:		32					
2	HUM132	Philosophy	G	5	150	1/0/2	105		
	HUM122	Psychology	G	2	60	1/0/0	45		
	MNG467	Fundamentals of Entrepreneurship, Leadership and Anti-Corruption Culture	G	3	90	1/0/1	60		
	OHS451	Life safety		2	60	1/0/0	45		
	MAP434	Cartography	B	5	150	2/1/0	105		
	MAP489	Theoretical basis of land management	B	5	150	2/0/1	105		
	MAP476	Basics of the cadastre	P	5	150	1/0/2	105		
	KPA103	Physical education III	G	2	60	0/0/2	30		
		Total:		29					
		3 semester							
	CHE477	Information and Communication Technologies (eng)	G	5	150	2/1/0	105		
	HUM127	Sociology	G	2	60	1/0/0	45		
	OHS452	Ecology and sustainable development	G	2	60	1/0/0	45		
	MAP496	Pedology	B	5	150	1/0/2	105		
	MAP477	Digital mapping	B	5	150	1/0/2	105		
	MAP414	Land law	P	5	150	1/0/2	105		
	MAP490	Land Management control	B	5	150	2/0/1	105		
	KPA104	Physical education IV	G	2	60	0/0/2	30		
		Total:		31					
3	MAP481	Geodetic instruments	B	5	150	1/0/2	105		
	MAP491	Organization and planning of land cadastral works	B	5	150	1/0/2	105		
	EAP111	Labor protection	B	5	150	1/0/2	105		
	MAP487	Territorial planning and Forecasting	D	5	150	1/0/2	105		
	MAP420	Land Use Planning	D	5	150	1/0/2	105		
	MAP440	Geoinformation technologies in land management	P	5	150	1/0/2	105		
		Total:		30					
		4 semester							
	MAP191	State control of use and protection of lands	B	5	150	1/0/2	105		
	MAP448	Estimation of land	B	5	150	2/0/1	105		
	MAP473	Engineering geodesy	B	5	150	1/0/2	105		
	MAP153	Photogrammetry	P	5	150	1/0/2	105		
	MAP454	Automated tasks maintenance of cadastre. of work	P	5	150	2/0/1	105		
	MAP190	State registration and accounting of land	P	5	150	1/0/2	105		
		Total:		30					
4	MAP485	Global navigation satellite systems	P	5	150	1/0/2	105		
	MAP425	Remote sensing of the earth	P	5	150	1/0/2	105		
	MAP499	Basics of laser scanning	P	5	150	1/0/2	105		
		Elective	B	3	90	1/0/1	60		
		Elective	P	2	60	0/0/2	30		
		Total:		20					
		8 semester							
		Elective	B	5	150	1/0/2	105		
		Elective	B	5	150	1/0/2	105		
	EC A103	Graduate thesis (project) preparation*	FA	6					
	EC A105	Graduate thesis (project) defense*	FA	6					
		Total:		22					

Type	№	Code	Name	Cycle	Credits	Semester
			Compulsory types of training with P/NP grade			
	1	AAP303	Educational practice (6)	B	2	2
	2	AAP141	Industrial internship 1 (P)	B	4	4
	3-4	AAP178	Industrial internship II (P)	P	6	6
			Additional types of training			
	1		Sports club-sectional	G	0	1-7
	2-3	AAP500	Military training	G	0	3-6

The number of credits for the entire period of study				
Discipline cycles	Credits			
	obligatory	elective		Total
Cycle of general education disciplines (G)	58			58
Cycle of basic disciplines (B)	69	35		112
Cycle of profiling disciplines (P)	50	10		60
Total of theoretical training:	203	29		230
Final attestation (FA)	12	0		12
Total:	215	29		242

Decision of the Academic Council of KazNRTU named after K.SATPAYEV. Protocol No. 3 dated "25." 06 2021
Decision of the Educational and Methodological Council of KazNRTU named after K.SATPAYEV. Protocol No. 6 dated "14." 06 2021
Decision of the Academic Council of the Institute of _____ Protocol No. _____ dated "___" _____ 2021

Vice-Rector for Academic Affairs — B.A.Zhautikov
Director of the Institute of Geology, Oil and Mining named after K. Turyshev — A. Syzdykov
Head of the Chair of "Mine Surveying and Geodesy" — E.O. Orynbasserova
Specialty Council Representative — Zh. Malchubaev

СӘТБАЕВ УНИВЕРСИТЕТІ | SATBAYEV UNIVERSITY

SATBAYEV UNIVERSITY

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

APPROVED
Director of the Institute of Geology, Oil and Mining named after K. Turysov
_______ A.Kh. Syzdykov
28 06 20

ELECTIVE DISCIPLINES for recruitment for 2021-2022 academic year

CURRICULUM OF THE EDUCATIONAL PROGRAM for recruitment for the 2021-2022 academic year

Educational program 6B07304- "Geospatial digital engineering"

Group of educational programs B075-Cadastre and land management

Year of study	Elective code	Discipline Code	Name of disciplines	Cycle	credit	Total hours	lec/lab/prac	IWS (including IWST), in hours	Prerequisite
			7 semester						
4		MAP492	Landscape science	B	3	90	1/0/1	60	
		MAP493	Soil assessment						
		MAP494	The land-owner: device and plan of the population	P	2	60	0/0/2	30	
		MAP496	Planning and construction of settlements						
			Total:		5				
			8 semester						
		MAP470	Management of land surveying and cadastral works	B	5	150	1/0/2/3	105	
		MAP472	Cadastral sounding, valuation and taxation						
		MAP188	Land reclamation	B	5	150	1/0/2/3	105	
		MAP402	Remediation and protection of lands from erosion						
			Total:		10				

The number of credits in elective disciplines for the entire period of study

Discipline cycles	Credits
Cycle of general education disciplines (G)	0
Cycle of basic disciplines (B)	13
Cycle of profiling disciplines (P)	2
TOTAL:	15

Decision of the Academic Council of the Institute of Geology, Oil and Mining named after K. Turysov. Protocol No. ___ dated "___" ______ 2021

Head of the Chair of "Mine Surveying and Geodesy" _______ E.O. Orynbasarova

7 Competencies acquired by students in the assignment of the educational program "Geospatial Digital Engineering"

General cultural competences (GK)	
GC - 1	The ability to communicate in oral and written forms in the state, Russian and foreign languages for solving problems of interpersonal and intercultural interaction
GC - 2	Understanding and practical use of the norms of a healthy lifestyle, including prevention issues, the ability to use physical culture to optimize performance
GC - 3	The ability to analyze the main stages and patterns of the historical development of society for the formation of civic position
GC - 4	The ability to use the foundations of philosophical knowledge to form a worldview position
GC - 5	The ability to critically use the methods of modern science in practice
GC - 6	Awareness of the need and the acquisition of the ability to independently study and improve their qualifications throughout their working life
GC - 7	Knowledge and understanding of professional ethical standards, mastery of professional communication techniques
GC - 8	Ability to work in a team, tolerantly perceiving social, ethnic, confessional and cultural differences
GC - 9	The ability to use the foundations of mathematical knowledge in various fields of activity, to apply the theory of partial differential equations to solve and research applied problems, to form ideas about the implementation of numerical methods for solving boundary value problems using Matlab
General professional competences (GPC)	
GPC-1	The ability to acquire new knowledge with a high degree of independence using modern educational and information technologies
GPC-2	Possession of computer skills with basic programming sufficient for professional activity
GPC-3	Knowledge of the basic methods, methods and means of obtaining, storing, processing information, the ability to use modern technical means and information technologies to solve communication problems using traditional media, distributed knowledge bases, as well as information in global computer networks
GPC-4	Understanding of the essence and significance of information in the development of modern society, the ability to receive and process information from various sources, the readiness to interpret, structure and design information in a form accessible to others
GPC-5	The ability to solve standard tasks of professional activity based on information and bibliographic culture using information and communication technologies and taking into account the basic requirements of information security
Professional competencies (PC)	
P	Professional competencies, including in accordance with the requirements of industry professional standards, providing deep theoretical knowledge and practical skills in the field of geospatial technology
PC - 1	A wide range of theoretical and practical knowledge in the professional field, technology

PC - 2	Own geodetic, photogrammetric and cartographic instruments, technical means of space geodesy, computers and automated information processing
PC - 3	Possess the general principles and methods of topographic-geodetic, astronomical-geodetic and cartographic work performed in modern conditions of cartographic-geodetic production;
PC - 4	Ability to carry out the main technological processes of topographic and geodetic, aerial photogrammetric and cartographic works;
PC - 5	The ability to calculate the technical and economic efficiency when choosing technical and organizational solutions for topographic, geodetic and cartographic production;
PC - 6	Own modern technologies for obtaining field geodetic information for mapping the country's territory and updating the existing cartographic fund, including geoinformation and aerospace technologies.
PC - 7	Ability to develop, implement and control the quality and completeness of geodetic projects
PC - 8	Possess the skills of land management design, technology of land management process management

8 Matrix of competencies of the educational program "Geospatial Digital Engineering"

Discipline Index	Name of disciplines	General cultural									General professional					Professional							
		GC-1	GC-2	GC-3	GC-4	GC-5	GC-6	GC-7	GC-8	GC-9	GPC-1	GPC-2	GPC-3	GPC-4	GPC-5	PC-1	PC-2	PC-3	PC-4	PC-5	PC-6	PC-7	PC-8
Required component																							
LNG 1051	English	x		x		x	X	X	X														
LNG1012	Kazakh (Russian) language (A2)	x		x		X	x	x	x														
MAT00110	Algebra and the beginning of an introduction to analysis										x				x								
MAT101	Mathematics I										x				x								
MAT102	Mathematics II										x				x								
MAT103	Mathematics III										x				x								
PHY110	Introduction to physics																						
PHY111	Physics I										x												
PHY112	Physics II										x												
GEN101	Engineering and computer graphics											x	x	x									
MAP460	Topographic graphics															x			x				
KFK101	Physical Culture I,II																						
HUM113	Modern history of Kazakhstan				x				x														
MAP453	Geodesy (Introduction to the specialty)															x		x					
HUM124	Philosophy								x														
MAP123	Cartography			x										x		x			x				
MAP435	Theoretical foundations of land management													x		x							
MAP119	Engineering geodesy									x											x	x	
MAP105	Higher geodesy									x				x		x	x				x		
MAT126	Ordinary differential equations MatLab									x	x	x	x	x									
CSE174	Information and communication technologies (eng)									x	x		x	x									
MAP438	Soil science															x							x
MAP457	Gravimetry											x		x					x				
MAP111	Geodetic Instrumentation									x											x	x	
MAP139	Cadastre Basics															x			x				x
MAT127	Partial differential equations. Matlab									x													
MAP437	Digital mapping						X									x						x	

Discipline Index	Name of disciplines	General cultural									General professional					Professional							
		GC-1	GC-2	GC-3	GC-4	GC-5	GC-6	GC-7	GC-8	GC-9	GPC-1	GPC-2	GPC-3	GPC-4	GPC-5	PC-1	PC-2	PC-3	PC-4	PC-5	PC-6	PC-7	PC-8
MAP465	Organization and planning of land cadastral works													**x**		**x**						**x**	**x**
MAP439	Organization and planning of topographic and geodetic works						x							X							x	x	x
MAP436	Land administration								**x**							**x**			**X**				
MAP151	Theory of mathematical processing of geodetic measurements									**x**					**x**			**x**					
SAF146	Life safety					**x**													**X**				
MAP172	Photogrammetry																		**x**			**x**	
MAP110	Aerospace survey techniques											**x**			**x**	**x**				**x**			
MAP187	Monitoring of land use			**x**		**x**						**x**				**x**				**x**			**x**
MAP190	State registration and land registration																						**x**
BIO179	Ecology and sustainable development											**x**											
MAP142	Basics of laser scanning								**x**			**x**			**x**			**x**			**X**		
MAP101	Automation of topographic and geodetic works									**x**							**x**						
Elective courses																							
CSE199	Python Programming																						
CSE127	Object Oriented Programming																						
MAP114	Geoinformatics																						
MAP180	Landscape science	**x**									**x**				**x**	**x**			**x**				**x**
MAP121	Engineering and geodetic surveys					**x**				**x**					**x**		**x**	**x**	**x**			**x**	
MAP442	Geodetic works in land management															**x**							**x**
MAP183	Engineering arrangement of the territory															**x**							**x**
MAP147	Applied Geodesy		**x**							**X**													
MAP188	Land reclamation						**x**		**x**		**x**								**x**				**x**
MAP448	Land valuation	**x**		**x**												**x**							**x**
MAP125	Space geodesy					**x**				**x**		**x**		**x**			**x**			**x**			
MAP421	Forecasting the use of land resources	**x**		**x**												**x**							**x**
MAP461	Cadastre of settlements						**x**									**x**			**x**				**x**
MAP137	Monitoring structural deformations		**x**	**x**						**x**			**x**				**x**			**x**		**x**	
MAP452	Urban cadastre	**x**																					
MAP420	Land use design								**x**							**x**						**x**	**x**
MAP117	Global navigation satellite systems									**x**		**x**						**x**			**x**		
MAP191	State control over the use and protection of land															**x**							**x**

Discipline Index	Name of disciplines	General cultural									General professional					Professional							
		GC-1	GC-2	GC-3	GC-4	GC-5	GC-6	GC-7	GC-8	GC-9	GPC-1	GPC-2	GPC-3	GPC-4	GPC-5	PC-1	PC-2	PC-3	PC-4	PC-5	PC-6	PC-7	PC-8
MAP462	Land management of peasant (farmer) households															x			x			x	
MAP148	Applied photogrammetry		x											x					x			x	
MAP445	Technical inventory of real estate					x										x							
MAP407	Local land management						x		x		x					x							x
MAP198	Fundamentals of digital photogrammetry							x									x		x				
MAP402	Reclamation and protection of land from erosion										x			x	x				x				x
MAP463	Information systems of the state land cadastre	x										x			x	x							x
MAP425	Earth remote sensing									x			x	x									
MAP167	Territorial planning and forecasting					x								x		x						x	
MAP464	Land and real estate market	x							x				x								x		x

Educational Program "Geospatial Digital Engineering"			
A TASK	GENERAL KNOWLEDGE / SKILLS		
	RANGE OF MINIMUM COMPETENCE	DEPTH OF MINIMUM COMPETENCE	ABOVE MINIMUM COMPETENCE
Understand and use the terminology of geospatial technology	Understand the General terminology base of disciplines	Understand the terminology specific to the discipline	To understand the terminology in the areas of terminology
Application of technical software and information databases.	Determine what technical software and information databases exist in all disciplines.	Understand and use the generally accepted technical software and information databases specific to the discipline.	Use specialized technical software and geographic information databases
Application of information and communication technologies and automation tools	Application of information and communication technologies for automated search and processing of information	Application of information and communication technologies and automation tools within the discipline	Application of information and communication technologies and automation tools in engineering and technical methods, in different disciplines
Applying knowledge of working with professional hardware and software	Knowledge of theoretical and practical basics of working with professional equipment and software in the following disciplines	Application of knowledge of working with professional equipment and software to perform surveys and calculations, perform quality assessment of materials within the discipline	Application of theoretical and practical skills of working with modern geodetic equipment and software for the development of projects of topographic and geodetic, cartographic and land management works to solve specific professional tasks.
Application of Geoinformation technologies	Receiving, storing, and processing data in a GIS environment	Performing data analysis to solve problems within the discipline	Database design, modeling, and interpretation of results in GIS
Assessment of technical and economic technologies	Understand basic economic principles	To perform economic calculations in the framework of this discipline	Perform economic assessment and calculation of project performance within the discipline

Perform duties in compliance with ethical and legal standards	Regulation of relations with compliance with ethical standards of General engineering practice	Regulation of relations with compliance with ethical standards within the discipline	Ethical legal norms that govern attitudes and behavior across disciplines

9 Minor Additional Education Policy

Additional education Minor in the specialty "Assessment" - 5B090800

When mastering at least 12 credits in disciplines of the program, including the following compulsory disciplines:

M1 – Basics of economic theory

M2 – Management Basics

M3 – Marketing Basics

An additional specialty is assigned Minorc the issuance of an application to the diploma of the established form.

10 Annex to the diploma for standard ECTS

Bachelor of Engineering and Technology, 5-6 level of the national qualifications framework with the right to hold the following positions: engineer-surveyor, engineer-cartographer, engineer-land surveyor, cadastral engineer, engineer-aerial surveyor (5th level), production manager, leading surveyor, leading cartographer, leading land surveyor, etc. (Level 6) at construction, topographic and geodetic, space enterprises of the mining and metallurgical industry in accordance with the Sectoral Qualifications Framework "Mining and Metallurgical Industry" dated August 16, 2016 No. 1 of the Association of Legal Entities "Republican Association of Mining and Mining and Metallurgical Enterprises".

SATBAYEV UNIVERSITY

SatbayevUniuversity
Сәтбаевуниверситеті

DIPLOMA SUPPLEMENT
 # _____

This Diploma Supplement follows the model developed by the European Commission, Council of Europe and UNESCO/CEPES. The purpose of this supplement is to provide sufficient independent data to improve the international 'transparency' and fair academic and professional recognition of qualifications (diplomas, degrees, certificates, etc.) It is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free of any value - judgements, equivalence statements or suggestions about recognition. Information should be provided in all eight sections. Where information is not provided, a reason should be given.

1	INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION	
1.1	Family Name	
1.2	Given Name	

1.3	Date of Birth (Day/Month/Year)	
1.4	Student Identification Number	
2.	INFORMATION IDENTIFYING QUALIFICATION	
2.1	Title of Qualification and the Title Conferred	Bachelor in Technics and Technology. Level 6
2.2	Major	
2.3	Minor	
2.4	Name and Status of Awarding University in original language	Сәтбаев университеті
2.5	Name and Status of Awarding University in English	Satbayev University
2.6	Language of Instruction	
3	INFORMATION ON THE LEVEL OF THE QUALIFICATION	
3.1	Level of Qualification	Bachelor's level/ first-cycle degree of higher education
3.2	Official Length of Program	4 or 3 years
3.3	Access Requirements	
4	INFORMATION ON THE CONTENTS AND RESULTS GAINED	
4.1	Mode of Study	Full-Time
4.2	Program Requirements	129 credits of the Republic of Kazakhstan (240 ECTS credits), including General Studies – 30 (56 ECTS) credits, Basic Engineering Studies – 59 (110 ECTS) credits, Professional Studies – 40 (74 ECTS) credits, Elective Courses – 60 (112 ECTS) credits. Additionally, Practical Trainings – 6 (11 ECTS) credits, a Final Diploma Thesis – 3 (6 ECTS) credits
4.3	Program Details	*Attached in transcript of records*
4.4	Grading Scheme	

Evaluation	**GPA**	**Point %**	**Appreciation**
A	4	95-100	"Excellence"
A-	3,67	90-94	"Excellence"
B+	3,33	85-89	"Good"
B	3	80-84	"Good"
B-	2,67	75-79	"Good"
C+	2,33	70-74	"Good"
C	2	65-69	"Pass"
C-	1,67	60-64	"Pass"
D+	1,33	55-59	"Pass"
D	1	50-54	"Pass"

5	INFORMATION ON THE FUNCTION OF THE QUALIFICATION	
5.1	Access to Further Study	Eligible for second-cycle higher education, graduate programs in master
5.2	Professional Status	Under legislation of the Republic of Kazakhstan, a person who was taken Bachelor in Technics is qualified for posts or positions in the industrial, public and scientific sectors for which the qualification requirement is a first higher education degree in major study. In some cases, the qualification requirement also includes the completion of studies in certain specified fields of minor study. The degree is also satisfied and corresponded to the Article 11 of the Directive of the European Parliament on the recognition of professional qualifications under level D of The European Union
6	ADDITIONAL INFORMATION	
6.1	University Address	22 Satpayev Street, Almaty, 050013, Kazakhstan

		http://satbayev.university
6.2	Further information source	http://edu.gov.kz/ru
7	CERTIFICATION OF THE SUPPLEMENT	
7.1	Place and Date	“ ’ 20 Almaty, Kazakhstan
8	INFORMATION ON THE NATIONAL HIGHER EDUCATION SYSTEM	
The education system of the Republic of Kazakhstan consists of basic secondary education, general upper secondary education, vocational upper secondary education, higher education and graduate education. The basic education consists of a 9-year compulsory school for all children from 6 to 15 years of age. Post-compulsory education is given by general upper secondary schools for 2 or 3 years and vocational upper-secondary institutions. The general upper secondary school provides a 2- or 3-years, at the end of which the pupil takes the Unite National Test (UNT) examination for 2-year study and the Matriculation examination for 3-year study. Vocational institutions provide 3-year programs, which lead to upper secondary vocational qualifications with further the Complex Test Attestation (CTA). General eligibility for higher education is given by the UNT for a 4-year study, the Matriculation examination or the upper secondary vocational qualification with gained CTA results for a 3-year higher education. Higher education studies are measured in credits. Study courses are qualified according to the workload required. One year of studies is equivalent to 1600 hours of student work on the average and is defined as 36 National credits or 60 ECTS credits. The credit system after recalculation complies fully with the European Credit Transfer and Accumulation System (ECTS)		
8.1	University Degree	The Government Decree on University Degrees (GOSO/2016) defines the compulsory objectives, extent and overall structure of degrees. The universities decide on the detailed contents, curricula, forms of instruction and structure of the degrees they award
8.1.1	First-Cycle (Bachelor)	The first-cycle university degree (Bachelor) consists of 99 (184 ECTS) credits for 3 years of full time study or 129 (240 ECTS) credits for 4 years. The degree is called Bachelor in Technics (Техникабакалавры) in all fields of study except Medicine and Architecture. The determined English translation for all the degrees corresponds to Bachelor of Science in the European countries and USA. Studies forwarding to the degree provide the student with: (1) functional knowledge of the fundamentals of the major and minor subjects or corresponding study entities or studies included in the degree program as well as the prerequisites for following study in the field; (2) functional knowledge and experimental skills needed for scientific thinking and the use of scientific methods for research needs; (3) functional knowledge and learning skills needed for studies leading to graduate university degrees and continuous learning; (4) professional skills and capacity for applying the acquired learnings to professional work at the field and beyond; (5) three-lingual language capacity (Kazakh / English/ Russian) and communication skills. Studies forwarding to degree include at least General Studies – 30 (56 ECTS) credits, Basic Engineering Studies – 59 (110 ECTS) credits, Professional Studies – 40 (74 ECTS) credits, Elective Courses – 60 (112 ECTS) credits. Additionally, Practical Trainings – 6 (11 ECTS) credits, a Final Diploma Thesis – 3 (6 ECTS) credits
8.2.1	Second-Cycle (Master)	The second-cycle university degree (Master) consists at least 24 (45 ECTS) credits for 1-year full-time study, 36 (67 ECTS) credits for 1.5-years full-time study or 50 (93 ECTS) credits for 2-years full-time study. The degree is usually called Master in Technics or Master in Business Administration for 1 and 1.5-year full-time study; Master in Science for 2-years full-time study. The admission requirements for the second-cycle university degree (graduate) is a first-cycle university degree (undergraduate). General eligibility for the second-cycle education is given by a combination grade of the National Test of English Language unless an applicant has IELTS test results certified 6.0 overall and the Proficiency Examination, which is corresponding to GRE Subject Examination. Studies forwarding to the second-cycle university degree (Master) provide graduate with: (1) profound knowledge of the major subject or a corresponding entity and conversance with the fundamentals of the advanced studies in the field; (2) advanced knowledge and research skills needed to apply scientific knowledge and research approaches required for independent and demanding experimental work (dissertation); (3) good overall knowledge and professional skills in major field needed for operating as

		an expert and developer of the field; (4) scientific knowledge and interests needed for scientific (Doctoral) or postgraduate education devoted to cutting-edge science; (5) fluent professional English, communication and oral skills. Studies forwarding to degree include at least Intermediate Studies – 8 (15 ECTS) credits and Advanced Studies – 16 (30 ECTS) credits. Additionally, Internship improving expertise – 6 (11 ECTS) credits, a Final Dissertation Work – 6 (11 ECTS) credits
8.2	Doctoral Degree (PhD in Science)	Applicants can apply for doctoral (PhD) studies after the completion of a relevant second-cycle degree. General eligibility for PhD education is given by a combination grade of the National Test of English Language unless an applicant has IELTS test results certified 6.0 overall and the Proficiency Examination, which is corresponding to GRE Subject Examination, as well as at least 3 year research experience in the relevant field required. The aim of doctoral studies is to provide student with an in-depth, profound knowledge of their field of science through their scientific research and capabilities to produce novel scientific knowledge or solution independently. The Doctor's degree takes minimum 3 years to complete. An applicant who has been admitted to complete PhD Doctor's degree must take 12 (20 ECTS) credits of interdisciplinary study, show independent and critical thinking in the field of research and write PhD dissertation to defend in public

11 BRIEF DESCRIPTIONS OF THE DISCIPLINE
English
CODE – LNG1051-1057
CREDIT – 6 (0/0/3/3)
PREREQUISIT – diagnostic test /LNG1051-1056

CODE - LNG1051
CREDIT - 6 (0/0/3/3)
PURPOSE AND TASKS OF THE COURSE

The discipline in English "English" is designed primarily for learning from scratch. This course is also suitable for those who have only general elementary knowledge of the language. After passing this level, the student will be able to confidently communicate on basic topics in English, learn the basics of grammar and lay a certain foundation that will allow them to improve their skills at the next stage of learning English.

BRIEF DESCRIPTION OF THE COURSE

The language material of the course is selected in such a way that the student, assimilating the lexical and grammatical minimum, had the opportunity to get acquainted with typical communicative situations and himself in such situations found himself, was able to correctly evaluate them and choose the appropriate model (strategy) of speech behavior.

At the same time, the main emphasis of teaching is transferred from the process of transferring knowledge to teaching the ability to use the target language during the implementation of various types of speech activity, which are reading (subject to reading comprehension), listening (under the same condition) and the production of texts of a certain complexity with a certain degree of grammatical and lexical correctness.

The material for the classes is selected so that students, while studying the English language, acquire the skills of reading, writing and understanding sounding speech based on the simultaneous mastering of the basics of grammar (phonetics, morphology and syntax) and word usage in the course of constant repeated repetition with a gradual complication of tasks.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

By the end of the first semester, a student, subject to the active organization of work in the classroom and conscientious completion of homework, acquires skills and abilities corresponding to the European level A2 (Threshold according to ALTE classification), that is, is on the threshold of the level of independent language proficiency.

Kazakh / Russian language
CODE – LNG104
CREDIT – 5 (0/0/3)
PRE-REQUISIT – diagnostic test

PURPOSE AND TASKS OF THE COURSE

1) teach students to perceive by ear statements on well-known topics related to home, study, free time;
2) understand texts on personal and professional topics containing the most common words and expressions;
3) be able to conduct a conversation on everyday topics; describe your experiences; tell your opinion; retell and evaluate the content of a book read, a movie seen;
4) be able to create simple texts on well-known topics, including those related to professional activities.

BRIEF DESCRIPTION OF THE COURSE

The language material of the course is selected in such a way that the student, assimilating the lexical and grammatical minimum, had the opportunity to get acquainted with typical communicative situations and himself in such situations found himself, was able to correctly evaluate them and choose the appropriate model (strategy) of speech behavior.

At the same time, the main emphasis of teaching is transferred from the process of transferring knowledge to teaching the ability to use the target language during the implementation of various types of speech activity, which are reading (subject to reading comprehension), listening (under the same condition) and the production of texts of a certain complexity with a certain degree of grammatical and lexical correctness.

The material for the classes is selected so that students, while studying the Kazakh / Russian language, acquire the skills of reading, writing and understanding sounding speech based on the simultaneous mastering of the basics of grammar (phonetics, morphology and syntax) and word usage in the course of constant repeated repetition with a gradual complication of tasks.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

By the end of the first semester, a student, subject to the active organization of work in the classroom and conscientious completion of homework, acquires skills and abilities corresponding to the European level A2 (Threshold according to ALTE classification), that is, is on the threshold of the level of independent language proficiency.

General chemistry
CODE – MAT494
CREDIT – 5 (1/1/1)
PRE-REQUISIT – diagnostic test

PURPOSE AND TASKS OF THE COURSE

The purpose of the course is to familiarize students with the basic ideas and concepts of algebra and mathematical analysis and the formation of the basic knowledge necessary to study the course " General chemistry".

Tasks of the course – the formation of skills for the study of mathematical disciplines and the effective use of mathematical methods for solving scientific research and practical problems in the professional field.

BRIEF DESCRIPTION OF THE COURSE

- the course "General chemistry" gives the basic concepts of algebra, mathematical analysis, differential and integral calculus.
-

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

should know:

- basic concepts of algebra;
- basic concepts of mathematical analysis;
- basic elementary functions;

should be able to:

- find solutions to equations and inequalities, systems of equations and inequalities;
- convert algebraic and trigonometric expressions;
- solve word problems;
- find the derivative of elementary functions;
- explore functions using a derivative;
- find the indefinite integral of elementary functions;
- find a definite integral;
- find the area of a curved trapezoid.

Math I
CODE – MAT101
CREDIT – 5 (1/0/2)
PRE-REQUISIT – Elementary Mathematics-School Course / Diagnostic Test

PURPOSE AND TASKS OF THE COURSE

The main goal of the course is to give the future specialist a certain amount of knowledge on the sections of the course "Mathematics-I", which is necessary for studying related engineering disciplines. Introduce students to the ideas and concepts of calculus. The main attention is paid to the formation of basic knowledge and skills with a high degree of their understanding of differential and integral calculus.

Tasks of the course:

- acquiring the knowledge necessary for the effective use of rapidly developing mathematical methods;

- getting the skill of building and researching mathematical models; possession of fundamental sections of mathematics necessary for solving scientific research and practical problems in the professional field.

BRIEF DESCRIPTION OF THE COURSE

The course "Mathematics-I" contains a presentation of the sections: introduction to analysis, differential and integral calculus

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

The study of this discipline will allow the student to apply the course "Mathematics-I" to solving simple practical problems, find tools sufficient for their research, and obtain numerical results in some standard situations.

Maths II
CODE – MAT102
CREDIT – 5 (1/0/2)
PRE-REQUISIT – Maths 1

PURPOSE AND TASKS OF THE COURSE

The purpose of teaching the course " Maths II" is to form bachelors of ideas about modern mathematics as a whole as a logically harmonious system of theoretical knowledge.

Tasks of the course - to instill in students solid skills in solving mathematical problems with bringing the solution to a practically acceptable result. To develop primary skills in mathematical research of applied issues and the ability to independently understand the mathematical apparatus contained in the literature related to the student's specialty.

BRIEF DESCRIPTION OF THE COURSE

The course "Maths II" provides an accessible presentation of sections: elements of linear algebra and analytical geometry, differential calculus of functions of many variables, multiple integrals. "Maths II " is a logical continuation of the course " Maths I".

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

The study of this discipline will make it possible to apply in practice the theoretical knowledge and skills acquired with a high degree of understanding in the sections of the course, to use them at the appropriate level; translate into mathematical language the simplest problems posed in terms of other subject areas; acquire new mathematical knowledge using educational and information technologies; solve applied problems in the field of professional activity.

Physics
CODE – PHY468
CREDIT – 5 (1/1/1)
PRE-REQUISIT – diagnostic test

PURPOSE AND TASKS OF THE COURSE

The main goal of teaching the course Physics is to form ideas about the modern physical picture of the world and the scientific outlook.

BRIEF DESCRIPTION OF THE COURSE

The disciplines Physics are the basis of theoretical training for engineering and technical activities of graduates of a higher technical school and represent the core of physical knowledge necessary for an engineer operating in the world of physical laws.

The course "Physics" includes sections: physical foundations of mechanics, structure of matter and thermodynamics, electrostatics and electrodynamics. The discipline "Physics" is a logical continuation of the study of the discipline "Physics 1", and forms a holistic view of the course of general physics as one of the basic components of the general theoretical training of bachelors of engineering and technical profile. The discipline "Physics" includes sections: magnetism, optics, nanostructures, fundamentals of quantum physics, atomic and nuclear physics.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

- skills to use knowledge of fundamental laws, theories of classical and modern physics, as well as the use of physical research methods as the basis of a system of professional activity.

Engineering and computer graphics
CODE - GEN177
CREDIT - 5 (1/0/2)
PREREQUISIT - no

PURPOSE AND TASKS OF THE COURSE

"Engineering and Computer Graphics" is teaching students the theoretical and practical foundations of computer graphics, modern methods of creating and editing graphic images, which are used in the production of works in the field of geodesy and cartography.

The objectives of the course are to contribute to the formation of professional competence of bachelor students through the formation of skills and abilities to work with computer graphics for solving professional problems and the development of competencies related to the development of skills in working with modern information technologies and systems in the field of computer graphics.

BRIEF DESCRIPTION OF THE COURSE

"Engineering and computer graphics" is one of the main disciplines of engineering education, the course examines the general theoretical foundations of constructing and reading a drawing, rules for the implementation of technical drawings, as well as methods and means of computer graphics. The course contains a training program aimed at acquiring knowledge and skills in working with applied software packages for solving graphic problems, including 3D editors and carrying out the necessary geodetic measurements, processing and interpreting their results; on the automation of the process of execution and execution of drawings, text documents according to standards, on the study of modern principles of drawing construction, as well as on the use of modern tools in the field of their professional activities.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

The student will know:

- basic concepts from the theory of computer graphics;
- the main methods and standards used in engineering computer graphics;
- the basics of building graphic images;
- software and hardware for computer graphics, their functionality;.

The student will be able to:

- to use graphic software tools in practice, to apply them in the design of drawings, maps and plans;

use technologies and techniques of computer graphics, topographic and land management drawing;

The student will own:

- modern methods and means of information processing and storage;
- skills in the practical application of graphic packages for the design of fragments of topographic maps and plans

The modern history of Kazakhstan
CODE – HUM100
CREDIT – 6 (2/0/2)
PRE-REQUISIT – none

PURPOSE AND TASKS OF THE COURSE

The aim of the course is to familiarize students of technical specialties with the main theoretical and practical achievemen ts of domestic historical science on the problems of the history of modern Kazakhstan, an integrated and systematic study of the main stages of the formation and development of Kazakhstani society.

- analyze the features and contradictions of the history of Kazakhstan in the Soviet period;
- reveal the historical content of the foundations of the laws of political, socio-economic, cultural processes at the stages of the formation of an independent state;
- contribute to the formation of citizenship of students;
- educate students in the spirit of patriotism and tolerance, ownership of their people, the Fatherland;

BRIEF DESCRIPTION OF THE COURSE

The course Modern History of Kazakhstan is an independent discipline and covers the period from the beginning of the twentieth century to the present day. The modern history of Kazakhstan is studying the national liberation movement of the Kazakh intelligentsia at the beginning of the 20th century, the period of the creation of the Kazakh Autonomous Soviet Socialist Republic, and the process of formation of a multinational society..

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

- knowledge of events, facts and phenomena of the modern history of Kazakhstan;
- knowledge of the history of ethnic groups inhabiting Kazakhstan;
- knowledge of the main stages of the formation of Kazakh statehood;
- the ability to analyze complex historical events and predict their further development;
- the ability to work with all kinds of historical sources;
- the ability to write essays and scientific articles on the history of the Fatherland;
- the ability to operate with historical concepts;
- ability to lead a discussion;
- skills of independent analysis of historical facts, events and phenomena;
- public speaking skills.

Geodesy (Introduction to the specialty)
CODE – MAP453
CREDIT – 5 (1/0/2)
PRE-REQUISIT – none

PURPOSE AND TASKS OF THE COURSE

The purpose of the course is to familiarize students with science, which studies the shape and size of the Earth's surface or its individual sections by measurements, in the mathematical processing of measurements with the construction of maps, plans used to solve engineering, cadastral and other problems. The study is based on methods for determining the geometric proportions, sizes and location of the most significant objects, in relation to each other using modern technology and technology.

Course objectives: developing practical and applied skills:

- in angular and linear measurements with optical-mechanical and electronic geodetic instruments;
- in the mathematical processing of field measurements based on direct and inverse geodetic tasks according to the requirements of the instructions;
- determination of coordinates and marks of points of the earth's surface in a single coordinate system;
- in the construction of processed data on a plan or profile.

BRIEF DESCRIPTION OF THE COURSE

The course contains a training program that gives basic concepts about the shape and size of the Earth, coordinate systems used in geodesy, about orientation of lines on the ground, about plans, maps, profiles, about scale, about terrain, about angular and linear measurements, about various planned high-altitude surveys. The course is structured in such a way as to teach the student not only basic concepts, but also to teach how to perform field work of various horizontal-high-altitude surveys, process field measurements of various horizontal-high-altitude surveys, build and draw up a plan or profile when solving engineering problems using engineering and technology, in accordance with the requirements of the labor market.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

The student will know:

- device of basic geodetic instruments,
- methodology for performing angular, linear and altitude measurements on the earth's surface,
- rules for office processing of geodetic measurements,

- basic requirements for the preparation of topographic documentation.

The student will be able to:

- work with geodetic instruments when performing angular, linear and height measurements on the ground,
- carry out basic geodetic surveys,
- perform computational and graphic works when processing the results of geodetic measurements
- solve engineering problems according to plans, maps and profiles.

Philosophy
CODE – HUM132
CREDIT – 5 (1/0/2)
PRE-REQUISIT – Modern history of Kazakhstan

PURPOSE AND TASKS OF THE COURSE

The aim of the course is the formation of cognitive, operational, communicative, self-educational competencies

To solve problems:

- to contribute to the development of adequate world outlook guidelines in the modern world;
- to form creative and critical thinking in students;
- to distinguish between the ratio of spiritual and material values,

their role in the life of a person, society and civilization;

- contribute to the definition of their attitude to life and the search for harmony with the world around them.

BRIEF DESCRIPTION OF THE COURSE

"Philosophy" is the formation of a holistic worldview that has developed in the context of the socio-historical and cultural development of mankind. Acquaintance with the main paradigms of the methodology of teaching philosophy and education in the classical and post-classical traditions of philosophy. Philosophy is called upon to develop stable life guidelines, the acquisition of the meaning of one's being as a special form of spiritual production. Contributes to the formation of a moral character of a person with the ability to critical and creative thinking. The theoretical sources of this course are the concepts of Western, Russian, Kazakh scientists on the history and theory of philosophy.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

-knowledge of the main philosophical solutions

ideological issues in the context of culture;

- the ability to analyze the history of the development of philosophical thought;
- the ability to identify alternative ways of staging and

solutions to ideological issues in the history of human development;

- the ability to identify the main theoretical approaches in

the relationship of a person with society;

the ability to master the technique of performing independent

- knowledge of basic terms, main concepts and problems of philosophy;
- skills of searching for systematization of material;
- skills to freely discuss and accept rational

solutions;

- skills of ethical principles in professional activities.

Cartography
CODE – MAP474
CREDIT – 5 (2/1/0)
PRE-REQUISIT – none

PURPOSE AND TASKS OF THE COURSE

The aim of teaching the discipline "Cartography" is to teach students the methods and ways of mapping objects and phenomena, creating and updating topographic and thematic maps in the interests of the national economy, for research and protection of the environment and natural resources.

BRIEF DESCRIPTION OF THE COURSE

The aim of teaching the discipline "Cartography" is to teach students the methods and ways of mapping objects and phenomena, creating and updating topographic and thematic maps in the interests of the national economy, for research and protection of the environment and natural resources.

The main task of the discipline is to achieve compliance with the educational level of students with the qualification characteristics.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:

- independently carry out the work on creating the geographical basis of the map;
- to map the special content of objects and phenomena on topographic and thematic maps;
- be able to apply formulas for calculating distortion on maps. Students will be able to:
- perform calculations to draw up a projection;
- to perform generalization on a scale series;
- know the theory of preparing maps for publication;
- study modern programs for creating digital maps and plans.

Theoretical foundations of land management
CODE – MAP489
CREDIT – 5 (1/0/2)
PRE-REQUISIT – none

PURPOSE AND TASKS OF THE COURSE

The purpose of teaching the discipline is to study the basic provisions of the theory and practice of land management, methodological foundations and general theory of land management, patterns of development, object, content, types, principles, natural and socio-economic factors, analysis of land management.

BRIEF DESCRIPTION OF THE COURSE

Land management as a means of production. Land system and land reform. Land resources and their use. Historical experience of land management in our country and its use. Patterns of land management development. Concept, tasks and content of land management. Types, forms and principles of land management. Land properties and natural conditions in land management. Economic and social conditions considered in land management. Land management system in the RK. Land management science and its development.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:

- the main provisions of the science of land management;
- methodological foundations and general theory, patterns of development, content, types, principles, tasks of land management;
- land fund, land tenure and land use as a subject of land management,
- natural, economic and social factors of land management;
- historical experience of land management, agrarian policy;
- land management in modern conditions, the development of land management science.

Information and Communication Technologies (eng)
CODE - CSE677
CREDIT - 5 (2/1/0)
PRE-REQUISIT - no

PURPOSE AND TASKS OF THE COURSE

Training in the skills of applying modern information technologies in the field of professional activity.
The objectives of the course include:
- To reveal the basic concepts of the architecture of computer systems;
- To reveal the basic concepts of information and communication technologies and subject terminology;
- To teach how to work with software interfaces of operating systems;
- To teach how to work with data in a different presentation, both tabular structured and unstructured form;
- To teach to apply the basic principles of information security;
- To reveal the concepts of data formats and multimedia content. To teach how to work with typical applications for processing multimedia data. Use modern approaches to the presentation of the material;
- To reveal the concepts of modern social, cloud and email platforms and how to work with them;
- To teach how to use algorithms and programming methods to solve problems of automating business processes

BRIEF DESCRIPTION OF THE COURSE

The course contains a training program aimed at leveling the basic knowledge of students in the field of information and communication technologies. Contains a full range of topics, according to the Standard Curriculum of the State Educational Standard, with a predominance of training practical skills in working with data, algorithmization and programming. The course is designed in such a way as to teach students not only the basic concepts of architecture and modern infrastructure of information and communication technologies, but also to teach how to use these tools to solve problems of an applied nature. To teach how to optimize processes, apply adequate models and methods for solving practical problems using modern methods and tools of information technology, automate routine processes, be productive and efficient.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:
- Computer device;
- Architecture of computing systems;
- Infrastructure of information and communication technologies;
- Interfaces of modern operating systems;
- Modern tools for working with data of various nature and purpose;
- Types of information security threats, principles, tools and methods of data protection;
- The Python programming language.
- Students will be able to:
- Work with interfaces of modern operating systems;

- Work with modern application software for working with data of various nature and purpose;
- Apply modern social, cloud, email platforms to organize business processes;
- Program in an algorithmic programming language;
- Analyze, model, design, implement, test and evaluate information and communication technology systems

Soil science
CODE – MAP496
CREDIT –5 (1/0/2)
PRE-REQUISIT – none

PURPOSE AND TASKS OF THE COURSE

Formation of students' fundamental knowledge about the bio-bone shell of the Earth - soil, as a natural body, its formation, properties, development and evolution, patterns of geographical distribution, rational use and protection of soils; basic laws of soil and soil cover formation; patterns of zonal distribution of soils on the earth's surface and its relationship with natural zoning; patterns of energy flow and circulation of substances through the soil cover; about the soil-forming process and factors of soil formation; on the role of biological factors of soil formation in the formation of soils; about the properties and regimes of soils and the patterns of their changes in different conditions; about soil fertility and its change during the economic use of soils. The study of the course is supported by laboratory exercises.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

- to give students ideas about soils, about soil properties and methods of their assessment. The course is aimed at developing the skills and abilities of students to independently analyze the soil cover of territories, to understand their ecological state through data on the properties of soils, the composition of soil protection measures, and to use the knowledge gained in their professional activities.

Students will be able to:

A graduate in the direction of training a specialist in "Land management" and "Cadastre" should know: - Land resources of the republic - the history of soil appraisal - appraisal documentation - ways to assess agricultural land and urban land

- practical application of the results of soil appraisal The graduate must be able to: - use a soil map and soil methodology - carry out the selection of soil samples and carry out analysis (chemical, introductory-physical) - perform soil indexing - determine soil-ecological indicators for ordinary, irrigated and drained arable land, for hayfields and pastures, perennial plantations.

Geodetic Instrumentation
CODE – MAP481
CREDIT – 5 (1/0/2)
PRE-REQUISIT – none

PURPOSE AND TASKS OF THE COURSE

-Study of the design and technical features of optical-mechanical geodetic instruments;

-Evaluation of the accuracy of devices;

-Examination of the full cycle (preparation, work and data acquisition) of work with geodetic instruments;

BRIEF DESCRIPTION OF THE COURSE

Rangefinder devices. Laser electronic rangefinders. Laser levels and barcode bars, their application and features. Optical-mechanical theodolites, their accuracy classification. Key design features and axles. Electronic robotic tacheometers Leica TCRA 1205, TS 15. Use in geodesy of unmanned aerial vehicles.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:

- The device and principle of operation of geodetic instruments;
- Determination of accuracy, identification and compensation of factors affecting the accuracy of measurements;
- Segments and types of modern GNSS receivers;
- Types of modern instruments, their similarities and fundamental differences;

Students will be able to:

- Professional skills in working with geodetic instruments;
- Check the accuracy and performance and adjust the instruments;
- Choose the right type of instrument for certain geodetic works;
- To check and adjust geodetic instruments;
- Download data from the tool for further processing on special software

The engineering geodesy
CODE – MAP475
CREDIT – 5 (1/0/2)
PRE-REQUISIT – none

PURPOSE AND TASKS OF THE COURSE

Formation of theoretical knowledge and practical skills in the field of obtaining, processing and using geodetic information as the initial basis for making and implementing optimal decisions in the design, construction and operation of engineering systems and networks.

The objectives of the course include:

- To reveal the basic concepts of engineering geodesy;
- To reveal the theoretical basis and technology for performing geodetic measurements;
- To reveal the theoretical basis for processing the results of geodetic measurements;
- To acquaint with the regulatory framework in the field of engineering surveys, with the principles of design and construction of buildings, structures, engineering systems and networks and teach to adhere to them;
- To familiarize with the composition and technology of geodetic works, providing surveys, design, construction and operation of engineering systems and networks;
- To teach in operational conditions to make decisions on geodetic support of design, construction and operation of engineering systems and networks;
- To teach how to use topographic plans, maps and profiles to solve engineering problems;
- To reveal the general principles of organizing geodetic measurements, based on the use of advanced modern geodetic equipment, equipment and technology based on laser, electronic and automated systems.

BRIEF DESCRIPTION OF THE COURSE

The course contains a training program aimed at achieving the professional readiness of the graduate to solve engineering problems corresponding to his qualifications, in accordance with the requirements of the state general educational standard of

education. Contains a full range of topics on methods and means of producing geodetic measurements on the earth's surface, aimed at forming the foundations of engineering geodesy as a modern complex fundamental science,
and the formation of skills in the use of ready-made planning and topographic materials in solving engineering and practical problems.
The course is structured in such a way as to teach students in a production environment to use the theoretical foundations of engineering geodesy and make decisions on geodetic support for the design, construction and operation of engineering networks and systems. To teach how to optimize processes, apply methods for solving practical engineering problems using advanced modern geodetic techniques, equipment and technology based on laser, electronic and automated systems.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:

- on the principles and methods of making geodetic measurements on the earth's surface;
- on the close connection of engineering geodesy with all processes of design and construction of buildings and structures, engineering networks and systems;
- device of basic geodetic instruments;
- methodology for performing angular, linear, height measurements on the earth's surface;
- rules for office processing of geodetic measurements, basic requirements for the preparation of topographic documentation.

Students will be able to:

- to carry out works related to the design and construction of buildings and structures, the laying and operation of engineering networks and systems;
- work with geodetic instruments,
- to perform basic geodetic measurements and computational and graphic works when processing the results of geodetic measurements;
- to use ready-made planning and topographic materials in solving engineering and practical problems.

Digital mapping
CODE – MAP437
CREDIT – 6 (2/1/0/3)
PRE-REQUISIT – cartography

PURPOSE AND TASKS OF THE COURSE

The course "Digital Mapping" is an integral part of cartography. He studies and develops the theory and methods of creating digital and electronic maps, as well as automating cartographic work.

BRIEF DESCRIPTION OF THE COURSE

A digital map is a representation of map objects in a form that allows a computer to store, manipulate, and display the value of their attributes.

Digital maps are logical and mathematical descriptions of mapped objects and relationships between them (relationships of terrain objects in the form of their combinations, intersections, neighborhoods, different elevations in relief, orientations to the cardinal points, etc.), formed in the coordinates, projections accepted for conventional maps , systems of conventional signs, taking into account the rules of generalization and requirements for accuracy. Like ordinary maps, they differ in scale, subject matter, and spatial coverage.

The main purpose of digital maps is the basis for the formation of databases and automatic compilation, analysis, conversion of maps.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:

As a result of mastering the discipline, the theoretical foundations of the digital description of territorial objects, processes and phenomena.

Students will be able to:

Convert cartographic information into digital form; form an optimal technological scheme for creating a digital map, own: technological means of creating digital maps; skills of automatic and automated creation of digital maps.

Organization and planning of land cadastral works
CODE – MAP491
CREDIT – 6 (1/0/2)
PRE-REQUISIT –none

PURPOSE AND TASKS OF THE COURSE

The objectives of mastering the discipline (module) "Organization and planning of land management and cadastral work" are the development of the theoretical and practical foundations for the application of data on the organization of work in land management.

BRIEF DESCRIPTION OF THE COURSE

- Preparation and sending of requests to state authorities, local authorities, technical inventory bodies for the provision of documents necessary for the implementation of state cadastral registration and for the provision of information entered into the state real estate cadastre
- Entering information received in the course of intradepartmental interaction
- Consideration of applications / requests and documents received with them and necessary for the implementation of cadastral actions: checking the submitted documents for the absence of grounds for refusal or suspension of cadastral actions,

including conducting a spatial analysis of the information of the State Property Committee

-Preparation of a protocol for checking documents in accordance with cadastral procedures

-Making a decision based on the results of the cadastral procedures -Sending documents based on the results of consideration of an application for cadastral registration and documents necessary for the implementation of cadastral registration, for issuance / sending to the applicant.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students should know: the sequence of interconnected

cartographic, engineering and technical, inventory work on the study of the state of land, as well as on the organization of the territory, including the establishment of the boundaries of land management objects on the ground, performed in accordance with the established procedure and aimed at ensuring rational land use, land protection, creating a favorable environment and improving landscapes ...

Students should be able to: organize the conduct of cadastral surveys, aerial surveys, topographic and geodetic, soil, geobotanical and other surveys and measurements, land surveying, development of proposals for the rational use of land, which allow collecting data on quantitative and qualitative parameters of land plots of territories of the subjects of the Republic of Kazakhstan, municipal formations, other administrative-territorial entities and territorial zones that are objects of land management.

Land administration
CODE - MAP490
CREDIT - 5 (1/0/2)
PRE-REQUISIT – no

PURPOSE AND TASKS OF THE COURSE

The aim of studying the discipline "Land Management" is to obtain students' knowledge and skills in the field of professional organizational and administrative activities: land and property relations; management system for land resources and real estate objects, law enforcement activities to establish ownership and control the use of land plots and other real estate objects; monitoring of land and other real estate, substantiation of technical and organizational solutions, etc., allowing the land surveyor to assess the content and prospects of the direction of "land management" in

the system of modern social relations, to master the scientific and applied conceptual apparatus used in the system of land relations and land management.

BRIEF DESCRIPTION OF THE COURSE

Ability to use knowledge about land resources to organize their rational use and determine measures to reduce anthropogenic impact on the territory; the ability to apply knowledge of the laws of the country for the legal regulation of land and property relations, control over the use of land and real estate; the ability to use knowledge for the management of land resources, real estate, organization and conduct of cadastral and land management works.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

As a result of studying the discipline, the student should know:

- methodology, methods, techniques, the procedure for maintaining the State cadastre of real estate, land monitoring;
- technologies for collecting, systematizing and processing information, filling out cadastral documentation, and graphic materials for the purposes of the real estate cadastre and land monitoring;
- methods for the development of the use and protection of land resources, schemes of land management, urban planning and pre-design and materials, land management, urban planning and planning of populated areas.

Be able to: solve legal issues of regulation of land and property relations, resolve land and property disputes in accordance with applicable law.

Landscape science
CODE – MAP 492
CREDIT – 5 (1/0/1)
PRE-REQUISIT –none

PURPOSE AND TASKS OF THE COURSE

To acquaint with the main problems of modern landscape science, to form an idea of a single landscape sphere of the Earth, i.e. about the interconnections of the atmosphere, hydrosphere, biosphere and lithosphere against the background of their

integration with society. Acquisition of knowledge about the interaction of the landscape envelope with society. Consider the main interrelated processes taking place in the Earth's landscape envelope. Review the changes in the Earth's landscapes under the influence of human activities. Master the methodology of landscape research.

BRIEF DESCRIPTION OF THE COURSE

- History of origin and the current stage of development of landscape science;
- Conceptual foundations of landscape science;
- Natural components of the landscape;
- Morphological structure of the landscape;
- Functioning of natural geosystems;
- Drawing up a landscape-geophysical scheme;
- Landscape and ecological substantiation of rational nature management.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

- Know the paths and stages of landscape research;
- Know the areas of application of theoretical knowledge in landscape science;
- Have an idea of the applied problems of geoecology;
- Know the main types of modern landscape problems.

Students will be able to: Methods of landscape analysis and synthesis within their specialization; Knowledge of foreign experience in this area of scientific activity; Conduct landscape research in two directions - isomorphism (similarity) and connections; search for universal patterns of location of geographic objects and phenomena on earth surface.

Territorial planning and forecasting
CODE - MAR 167
CREDIT - 5 (1/0/2)

PRE-REQUISIT – no

PURPOSE AND TASKS OF THE COURSE

The purpose of teaching the discipline "forecasting the use of land resources": to formulate the features of forecasting the use of land resources in modern conditions and proposals for their accounting.

Tasks:

- know the specifics of forecasting the use of land resources;
- keep records of various functions of the land for various purposes;
- take into account the target setting for the development of a market mechanism for land use, a variety of forms of land ownership and management, land turnover;

BRIEF DESCRIPTION OF THE COURSE

The earth is a necessary material condition for any production process, life and economic activity of people. Neither the life of people nor their production activities is possible without land. Economic and other use of land is regulated by the norms of land law. In the sphere of the use and protection of land resources, forecasts are of great importance, which should be included in a unified system of forecasting and planning the development and distribution of the productive forces of the country and its regions. These forecasts are intended for a comprehensive solution to the problems of organizing the use, increasing the level of soil fertility and protecting land resources.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:

- modern methods for assessing land resources;
- targeting the development of a market mechanism for land use;
- variety of forms of land ownership and management, land turnover;
- to contribute to the improvement of the practice of forecasting land use as a function of land management;

Students will be able to:

- to increase the efficiency of land use in modern economic conditions;
- to organize the rational use of land in all sectors of the economy of the national economic complex of the country;
- to substantiate forecasts in the field of use and protection of land resources.

Life safety
CODE – SAF451
CREDIT – 2 (1/0/0)
PRE-REQUISIT –none

PURPOSE AND TASKS OF THE COURSE

The purpose of teaching the course "Life Safety" is measures to protect the population in emergencies in peace and wartime.

Objectives of the course: to apply the theory in a hazardous environment, the sources of the formation of hazards and its evolution.

BRIEF DESCRIPTION OF THE COURSE

Measures to increase the stability of economic facilities for functioning in emergency situations and when using modern means of destruction are outlined.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THECOURSE

- master the methods of solving in emergency situations
- choose methods of solution in case of emergencies of a man-made nature;
- to choose methods of solution in case of emergencies of natural character.

Photogrammetry
CODE – MAP155
CREDIT – 5 (1/0/2)
PRE-REQUISIT –none

PURPOSE AND TASKS OF THE COURSE

The purpose of the discipline is to study the theory of photogrammetry, methods and technology for obtaining, and photogrammetric processing of aerospace images for the creation and updating of topographic and cadastral maps, and other documents about the area.

The objectives of the discipline are the acquisition by students of knowledge and skills sufficient to plan a complex of works on photogrammetric processing of images obtained by aerospace and ground imaging systems.

BRIEF DESCRIPTION OF THE COURSE

Photogrammetry allows you to determine the shape, size and spatial position of the object under study from the images in a given coordinate system, as well as its area, volume, various sections at the time of shooting and changes in their values at a given time interval. The name of the discipline comes from the Greek words photos (light), gramma (record) and metreo (measure).

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

In the process of studying the discipline, the student will know: - theoretical foundations of photogrammetry;

- methods and systems used in photogrammetric processing of images; - technologies for creating and updating topographic maps and plans.

- to substantiate the options for technologies for creating and updating topographic and cadastral maps and plans by photogrammetric methods;

- to carry out the whole range of photogrammetric works.

State registration and land registration
CODE – MAP190
CREDIT – 5 (1/0/2)
PRE-REQUISIT –none

PURPOSE AND TASKS OF THE COURSE

The academic discipline "State registration and registration of real estate objects" refers to the general professional disciplines of the main professional educational program for training mid-level specialists, their application in practice.

Course objectives: theoretical component: - the subject of regulation of relations associated with the maintenance of the state cadastre of real estate;

- rights, restrictions (encumbrances) subject to state registration;

- principles of maintaining the state cadastre of real estate: - principles of maintaining the Unified State Register of Rights; - the composition of the information of the state real estate cadastre about the real estate object; - the grounds for the implementation of cadastral registration; - grounds for registration of rights to real estate objects and transactions with them.

BRIEF DESCRIPTION OF THE COURSE

In this course on the discipline State registration and accounting of land and real estate, the basic concepts, goals, objectives of the land cadastre, the procedure for conducting state registration, accounting of land and real estate in the Republic of Kazakhstan are considered.

The content program of the discipline is focused on achieving the following goals: - the formation of knowledge, skills and competencies among students in the field of state registration, accounting and land valuation, and their use in professional activities.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

Students should know:

- about types of land registration;
- types and methods of land registration
- about land registration and registration authorities.
- content and theoretical foundations of the discipline, terms and definitions; students should know:
- registration of land plots in land cadastre documentation;
- land registration procedure;
- procedure for registration of rights to land plots.

Land reclamation
CODE – MAP 188
CREDIT – 5 (1/0/2)
PRE-REQUISIT –none

PURPOSE AND TASKS OF THE COURSE

To acquaint students with the basics of scientific and practical knowledge in the field of land reclamation. Study of various types of land reclamation, methods of influencing natural processes and methods and technical means of regulating land reclamation regimes in accordance with their purpose.

Substantiation of ecological and economic feasibility and limits of permissible reclamation impacts on the natural environment and methods, methods and technical means for regulating reclamation regimes.

- **BRIEF DESCRIPTION OF THE COURSE**

- Purpose, essence and methods of land reclamation;
- Reclamation of agricultural land;
- Land reclamation of non-agricultural land.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will be able to: Substantiate the ecological and economic feasibility and limits of permissible reclamation impacts on the natural environment, substantiate the methods, methods and technical means of regulating reclamation regimes; effectively use reclamation equipment; apply the acquired skills in solving practical problems; describe the characteristics of agromeliorative landscapes; make assignments for the design of irrigation and drainage systems, economic plans for water use and plans for regulating the water regime; carry out calculations of the parameters of amelioration systems; substantiate the effectiveness of the functioning of reclamation systems; make decisions when performing calculations and the ability to reasonably prove your choice.

Students will have skills in calculating irrigation and drainage regimes, calculating the elements of irrigation and drainage techniques, designing irrigation, drainage, combined reclamation systems.

Land valuation
CODE - MAP448
CREDIT - 5 (1/0/2)
PRE-REQUISIT - no

PURPOSE AND TASKS OF THE COURSE

- to reveal the basic concepts and structures of the foundations of land management;
- in-depth study of the theoretical foundations of the state land cadastre;
- to teach to apply the basic methods of obtaining, processing and analysis in the land registry;
- to teach how to determine the qualitative and economic assessment of land.

BRIEF DESCRIPTION OF THE COURSE

The course contains a training program aimed at studying the theoretical foundations of the state land cadastre, which allows for a qualitative and economic assessment of land. Contains a full range of topics, according to the SESE Model Curriculum, with a predominance of developing practical skills in working with data. The course is structured in such a way as to teach students the theoretical foundations of the state land cadastre, also teach how to optimize processes, apply adequate methods for solving practical problems using modern methods and tools, automate routine processes, be productive and efficient.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:
- assessment of the value of land;
- the right to land;
- land registration;
- land fund of the Republic of Kazakhstan;
- cadastral assessment of land;
- land payments. Students will be able to:
- know the theoretical foundations of the state land cadastre;
- be able to analyze, process and receive data from the land registry;
- master the skills of drawing up reports on land valuation.

Management of land surveying and cadastral works
CODE - MAR 470
CREDIT - 5 (1/0/2)
PREREQUISIT – Land management, Cadastre.

PURPOSE AND TASKS OF THE COURSE

The purpose of teaching the discipline "Urban Cadastre" is to automate the process of maintaining a cadastre, maintain an archive of urban planning data, simplify the work of cadastral specialists, quickly respond to user requests, generate and issue the necessary urban planning documentation. The objectives of the course are the formation of practical and applied skills in the development of the graphic part of the urban planning cadastre, including: collection and analysis of cartographic data in paper form, analysis of the composition and structure of vector layers, their geometry, the structure of tables of attribute data of vector layers, a classifier, a manual and a list of abbreviations for creating an electronic map.

BRIEF DESCRIPTION OF THE COURSE

The course contains a training program that gives basic concepts about unified systems for maintaining an urban planning cadastre, collecting, monitoring, updating information about a settlement and the territory of urban planning regulation, a unified graphic and attributive database of an urban planning cadastre. Maintaining archived data, servicing user requests. Formation and output of executive and reference cadastral documentation (documents on objects, subjects of urban planning cadastre, etc.), as well as the possibility of simultaneous work in the system of several users.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

The listener will know: information in the form of a set of basic and thematic layers - from a topographic base to urban planning documentation, which establish the modes of use and urban planning load of the city's territories;

The student will be able to: draw up a zoning plan of the territory, which includes a land management project to streamline the territory of a settlement, conduct land management work and ensure the operation of geographic information systems. When studying the discipline, students will acquire professional skills to quickly make decisions using new technologies, a creative approach to the task at hand.

Land use design
CODE - MAP420
CREDIT - 5 (1/0/2)
PRE-REQUISIT – no

PURPOSE AND TASKS OF THE COURSE

To give theoretical knowledge and practical skills that allow mastering the methodology for performing the main and most difficult part of land management of the production design process, based on knowledge of the methodological foundations of land management, to master the methodology for drawing up and substantiating land management projects in relation to various natural conditions of the Republic of Kazakhstan.

BRIEF DESCRIPTION OF THE COURSE

Principles of land management, classification and content of land management projects, determination of the economic efficiency of design solutions, methods of organizing land use and land tenure, design features of land tenure for various purposes.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know: conducting topographic and geodetic, soil, geobotanical surveys and surveys, the materials of which are used to draw up and substantiate projects not only for land management, but also for land improvement, road construction.

Students will be able to: identify new fertile land for agricultural and other development, the formation of new and improve existing land tenure. To allot and seize land plots for state, private and public needs, as well as to establish and change the features of cities, towns and rural settlements, based on economic, environmental, social and legal justifications to make design decisions.

Ecology and sustainable development
CODE - CHE452
CREDIT - 2 (1/0/0)
PRE-REQUISIT – no

PURPOSE AND TASKS OF THE COURSE

Formation of the foundations of environmental knowledge, which is the theoretical foundation of all environmental protection measures, including measures to ensure the environmental safety of a person, preserve his health, greening consciousness and fostering environmental culture, allowing the future specialist to use environmental knowledge not only in narrow professional interests, but also to facilitate the exit societies out of the ecological crisis and moving towards sustainable development.

BRIEF DESCRIPTION OF THE COURSE

The history of the formation of ecology as a science. Autecology, demecology and synecology. Organism and environment. Population and its structure. Community ecology. Organisms and conditions of their existence. Ecosystem. The cycle of substances and energy in ecosystems. Biosphere and noosphere. Sustainable development concept. Resource saving. Life cycles and models of mutual influence of biological species. Nature reserves, state parks, national natural monuments.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Know: the history of the current state of environmental science as an interdisciplinary field of knowledge; the meaning and content of basic terms in the field of ecology, rational nature management; modern global and regional environmental problems, and ways to solve them; modern practical approaches to solving environmental problems at the international, national and organizational levels; preventive ways to reduce the burden on the environment.

Be able to: apply environmental knowledge to solve and predict possible environmental problems; apply methods of implementing low-waste industries and assessing the environmental efficiency of economic activities.
Have skills: to establish causal relationships between phenomena that occur in nature and society, to apply environmental knowledge to solve and predict possible environmental problems.

Inventory Basics
CODE – MAP476
CREDIT – 5 (1/0/2)
PRE-REQUISIT – history of Kazakhstan, ecology, geodesy.

PURPOSE AND TASKS OF THE COURSE

The purpose of teaching "Fundamentals of Cadastre" is to provide theoretical and practical skills in the system of accounting, registration and valuation of land, allowing information support for decisions of executive authorities, information support for the real estate market, development of market relations, protection and rational use of land.

BRIEF DESCRIPTION OF THE COURSE

Fundamentals of the cadastre contains a system of necessary information and documents on the legal regime of lands, their distribution by land owners, landowners, land users and tenants, land categories, about the quality characteristics and national economic value of lands. The cadastre is maintained by carrying out topographic and geodetic, cartographic, soil, agrochemical, geobotanical and other surveys and surveys.

Fundamentals of the cadastre is a state-established system of accounting, registration and valuation of land, which is aimed at regulating land relations and includes information about the legal, economic and natural state of land (technical, economic and legal description of land).

Fundamentals of the inventory is one of the main fundamental scientific and technical disciplines of the specialty, which studies:

• theoretical foundations for the creation and maintenance of a land cadastre and real estate appraisal, the relationship of this discipline with other related sciences; quantitative and qualitative characteristics of the land fund of the republic; principles of organization and planning of work on the land and city cadastre; system of registration, accounting and appraisal of real estate, land ownership and land use within the boundaries of cities and towns;

• the procedure and composition of documents for the allocation of land to state and commercial organizations for the implementation of the tasks assigned to them; - principles of allocation of accounting cadastral units;

• principles and methods of establishing the lines of cities and other settlements, boundaries of lands of special nature protection, historical, cultural and cultural purposes to ensure the regime of their use;

• a methodology for assessing real estate in cities and towns, preparing materials for the privatization of land, buildings and structures;

The inventory fundamentals course includes:

- study of the rules and procedures for improving the system of land use and land tenure;

- creation of conditions for rational and economically sound use of territories;
- increasing the completeness and reliability of maintaining the state land cadastre (urban and rural);
- accounting, registration and appraisal of land and real estate;
- conducting land management and cadastral surveys of urban and rural areas;
- state control over the use and protection of agricultural lands and lands of settlements;
- monitoring of urban and rural lands, land and real estate transactions.

The cadastre fundamentals course summarizes a whole range of knowledge of civil law, land law, land relations and land management, cartography, geodesy, aerial photogeodesy, photogrammetry and interpretation, soil science, geobotany, land reclamation, ecology, geoinformatics, the basics of urban planning and planning of settlements, engineering equipment of built-up areas , economic statistics, land and real estate valuation, etc.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:

• develop content and maintain cadastral documentation;

• to carry out structural, functional and parametric identification of land use and land tenure objects; assess land and real estate in market conditions;

• know the tasks and methods of land monitoring, work on land protection for various purposes; draw up options for the use of land;

• analyze regulatory, statistical and other data, carry out statistical processing of them and identify factors affecting the indicators of the efficiency of the use of land and real estate;

• analyze economic, land cadastral, geodetic data, data banks of information, carry out the necessary calculations.

Students will be able to:

When studying this discipline, students will gain professional skills in creating a cartographic and geodetic basis for geographic information systems (GIS); develop measures to reduce anthropogenic impact on the environment within districts, oblasts, regions; to form and solve problems of optimization of land use at the regional level.

Land and economic structure and planning of the population of places
CODE - MAR 494
CREDIT - 5 (1/0/2)
PRE-REQUISIT – no

PURPOSE AND TASKS OF THE COURSE

The purpose of teaching the discipline "Land management of peasant (farmer) households" is the development of theoretical and practical knowledge by students and the acquisition of skills in the field of land management of peasant farms for

orientation in modern conditions, rational organization of land use and land use territory, development of schemes and projects of inter-farm and intra-farm land management , contributing to the formation of a specialist in the field of land management and cadastre.

The objectives of studying the discipline are to teach students knowledge and skills:

- consideration of the land fund of the Republic of Kazakhstan, natural, economic and social conditions affecting and taken into account in land management of peasant farms;
- study of the laws of development, content and types of land management;
- acquaintance with the main preparatory measures necessary for the land management design of peasant farms.

BRIEF DESCRIPTION OF THE COURSE

The course program is aimed at studying the theoretical and legal foundations of land management of peasant (farmer) households. The program provides a full range of topics and its content corresponds to the Model Curriculum developed in accordance with the State Educational Standard of the Republic of Kazakhstan. The program includes: natural, economic and production characteristics of the land; general information about land management; general principles and content, land relations; natural, economic and social conditions taken into account in land management of peasant farms; mechanisms of land redistribution; land management system of peasant (farmer) households; different types of land management efficiency.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students should know:

- types of nature management, functional properties of the land; socio-economic characteristics of the land. Land protection methods;
- principles of land use for peasant farms.
- on-farm and inter-farm organization of the territory and production;
- the main normative legal acts governing land and legal relations;
- land policy of the Republic of Kazakhstan, principles of state regulation in the field of land relations. Types and forms of land use.
- Students should be able to:
- to assess the properties of the land and identify shortcomings in land use;
- to analyze the state of the land fund of the peasant economy;
- use the knowledge of land and civil legislation.
- Students must be proficient in:
- skills of decision-making in land cadastral activities;
- skills in working with an information base, land management;

skills of working with the information base of land management.

State control over the use and protection of land
CODE - MAP 191
CREDIT - 5 (2/0/1)
PRE-REQUISIT - no

PURPOSE AND TASKS OF THE COURSE

Organization of state control over the use and assessment of land. Timely identification of changes in the structure of the land fund and the state of land types, their assessment, forecast and development of recommendations for the prevention and elimination of the consequences of negative processes. Information support of the state land cadastre, rational use of land, control over the use and valuation of land.

BRIEF DESCRIPTION OF THE COURSE - to acquaint with theoretical Land accounting and control of use; The system of bodies for the implementation of state control over the use and assessment of land, the main regulations in the Republic of Kazakhstan; Carrying out quantitative and qualitative land registration, monitoring and land inventory; Types of violations of land legislation; Agricultural land valuation; State cadastre of real estate. Valuation of land and other real estate;

Compilation and content of the report on the control over the use and valuation of lands; Registration of annual reporting documentation for the control over the use and valuation of land.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

- Conduct inspections and surveys in order to ensure compliance with the requirements of the land legislation of the Republic of Kazakhstan;
- Conduct quantitative and qualitative registration of lands, take part in their inventory and monitoring;
- Monitor the use and assessment of land resources;
- Develop environmental protection measures, monitor their implementation;
- Assess the condition of the land;
- Prepare factual information about the use of lands and their condition;
- Conduct inspections and surveys to identify violations in the use and protection of land, the state of the environment, draw up acts, modern technology when creating cadastral maps and forming
- Students will be able to:
- Assess the natural conditions to substantiate the need, possibility and feasibility of planning reclamation and environmental protection measures in land management;
- To develop the most rational scheme for organizing the territory with the placement of elements of reclamation systems, artificial reservoirs and systems of water supply and wastewater disposal in rural areas;
- Draw up working projects for the improvement and reclamation of land, protection of soil from erosion and other negative processes;

Analyze and evaluate the effectiveness of various options for organizing a reclaimed area for the planned yield.

Remote sensing of the Earth
CODE - MAP425
CREDIT - 5 (1/0/2)
PRE-REQUISIT - no

PURPOSE AND TASKS OF THE COURSE

The main task of studying the discipline is to achieve the correspondence of the level of education of students with the qualification characteristics.

BRIEF DESCRIPTION OF THE COURSE

Currently, the main method for studying planets and satellites is remote sensing from automatic interplanetary stations (AMS). The creation of imaging equipment, its successful operation on board the AMS, the development of a ground-based complex for receiving and processing imaging information, processing of survey materials - this is an incomplete list of tasks on the successful solution of which the quality of cartographic products depends.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

The student will know: training of highly qualified specialists, engineers-geodesists, engineers - cartographers, to develop their knowledge.

The student will be able to: work with modern computer technology, work with space survey materials.

Reclamation and protection of lands from erosion
CODE - MAP 402
CREDIT - 5 (2/0/1)
PRE-REQUISIT - no

PURPOSE AND TASKS OF THE COURSE

Training in the skills of applying rational environmental management in the field of professional activities. Acquaintance with the current state of soils and land resources of the Republic of Kazakhstan, with a variety of factors and types of soil degradation. Study of the theoretical foundations of erosion-accumulative processes, ecological and economic aspects of soil protection from erosion and deflation. Development of skills to analyze the possibility of erosion development in order to independently solve practical problems for the environmentally balanced use of eroded and erosion-hazardous lands.

BRIEF DESCRIPTION OF THE COURSE

Principles of rational nature management. Types of nature arrangement. Drainage of agricultural land. Irrigation reclamation. Cultural-technical, anti-erosion and other methods of land improvement. Reclamation of non-agricultural land. Artificial reservoirs in the countryside. Agricultural water supply systems and schemes. Technical and biological reclamation of disturbed and contaminated lands. Protection of lands and ecological and economic substantiation of natural and man-made complexes and engineering systems of nature of arrangement.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:

- basic patterns of formation and movement of surface and ground waters and quantitative characteristics of the water balance of the territory;

- existing and promising types and methods of land reclamation and reclamation;

- basic design standards for reclamation systems and hydraulic structures, artificial reservoirs, agricultural water supply and drainage systems;
- the impact of reclamation measures on the water regime and natural conditions of the fields, the organization of the territory

Basics of laser scanning
CODE - MAP499
CREDIT - 5 (1/0/2)
PRE-REQUISIT – no

PURPOSE AND TASKS OF THE COURSE

- Study of ways to obtain field data using scanners, hardware and software at the construction site or a 3D model;

- Knowledge of transformation and processing of information obtained as a result of drawing graphic images of a laser scanner into a set of point clouds;

- Planning and development of a set of measures for working with the scanner, 3-dimensional calculation of dimensional data, determination of coordinates and completeness of changes in the region according to the initial data.

BRIEF DESCRIPTION OF THE COURSE

The role and significance of the subject "Fundamentals of Laser Scanning" in the training of specialists is determined by the use of a scanner device for the effective and efficient use of a 3D model of any object in construction, urban areas, architecture and design. The purpose of this discipline is to teach theoretical knowledge and practical skills using the methods and techniques of surveying the instrument used in the field of geodesy.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Students will know:
- Classification and condition of the local laser scanner;

- Technology and accuracy of a local laser scanner;
- The basis of the external orientation of the scans;
- Management software.

Students will be able to:
- Working with Scanstation 10
- Edit data imported into Cyclone and Real Works Survey applications;
- Shooting with the Faro Focus scanner.

Planning and arrangement of the territory of settlements
CODE - MAP495
CREDIT - 5 (1/0/2)
PREREQUISIT - none

PURPOSE AND TASKS OF THE COURSE

The purpose of the discipline is the mastery by students of methods and techniques for drawing up projects and plans related to the arrangement of lands in rural settlements.

The purpose of the discipline is to study the procedure for conducting the process of land and economic organization of rural settlements and the methodology for developing a project.

BRIEF DESCRIPTION OF THE COURSE

The problem of rational use of land. Establishment of boundaries of rural settlements, land-economic structure of rural settlements.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

-determines the legal basis for land management measures on the territory of settlements, the definition of ways and systems for land management and land management and coordination of centers of settlements, supervision of the basics of land management and land coordination.

- uses methods of quantitative and qualitative land registration and planning, indication of land and economic plans for the land of settlements, concerning the issues of cadastral land management documents and cadastral documents.

- carries out the maintenance of cadastral works on land management, registration of buildings and structures, maintenance of information flows and a basic automated information cadastre using the results of analysis of information on the land fund of the country, region, district, city and its parts.

- bases the analysis and use for state and other purposes of cadastral information on land-economic and land harmonization, guided by town-planning norms and rules, town-planning norms and land legislation.

- analyzes and uses the methods of carrying out work on land management and coordination, registration and inventory of buildings and structures, updating the existing methods for the development of samples of using inventory projects, forecast materials, land management schemes, other preliminary projects, etc.

Global navigation satellite systems
CODE – MAP485
CREDIT – 5 (1/0/2)
PRE-REQUISIT – none

PURPOSE AND TASKS OF THE COURSE

The goal of the discipline "Global Navigation Satellite Systems" is to provide students with a complex of knowledge about global navigation technologies, methods and means used in space, sea and ground navigation to determine navigation parameters and coordinates of points on the physical surface and in the Earth's atmosphere using global satellite navigation systems (GNSS).

The objectives of this course are:

- determination of navigation parameters and coordinates of points on the physical surface and in the Earth's atmosphere using GNSS;

- determination of the coordinates of static and dynamic objects using the absolute method;

- determination of the coordinates of static and dynamic objects using the differential method;
- implementation of route navigation using modern satellite technologies and navigation maps.

BRIEF DESCRIPTION OF THE COURSE

The discipline "Global Navigation Satellite Systems" is aimed at training a specialist for solving geodetic problems associated with the use of global navigation satellite technologies.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

In the process of studying the discipline, students must acquire theoretical knowledge and practical skills:
- get an idea of methods and tools for navigation;
- study the theory and basic principles of navigation;
-to study the principles and features of the functioning of global satellite radio navigation systems (SRNS);
- know the basics of the formation of navigation signals and information transfer to the SRNS;
- to know the structure and principles of operation of consumer satellite equipment, types and functionality of satellite receivers;
- be able to independently determine the coordinates of points in absolute and differential ways;

Social –political knowledge
CODE-HUM127
CREDIT – 2 (4/0/0)
PREREQUISITES - none

PURPOSE AND TASKS OF THE COURSE

The purpose of teaching the course "Social and political knowledge" is to form the socio-humanitarian worldview of students in the context of solving the problems of modernization of public consciousness, defined by the state program "Looking to the future: modernization of public consciousness".
1) mastering the basic social, political and humanitarian concepts, theories and approaches to the study of society and its subsystems;
2) formation of ideas about the basic principles of functioning of modern society and its social institutions;
3) development of skills for describing and analyzing current problems of modern society, the essence of social processes and relations;

4) mastering the main sources and methods of obtaining sociological, political, cultural and psychological
information by students;
5) instilling skills to use the knowledge gained in the process of mastering sociology, political science, cultural studies and psychology in professional activities.
6) formation of critical thinking skills and the ability to apply it in practice.

BRIEF DESCRIPTION OF THE COURSE

The discipline "Social-political knowledge" involves the study of four scientific disciplines-sociology, political science, cultural studies, psychology, each of which has its own subject, terminology and research methods. The interaction between these scientific disciplines are based on principles of informational complementarity; integration; methodological integrity of the research approaches of these disciplines; community education methodology and outcome-oriented; a single system view of the typology of learning outcomes as formed abilities.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Expected results of training based on the results of mastering the discipline:
1) explain and interpret the subject knowledge (concepts, ideas, theories) in all areas of science that form the academic disciplines of the module (sociology, political science, cultural studies, psychology);
2) explain the social and ethical values of society as a product of integration processes in the systems of basic knowledge of the disciplines of the socio-political module;
3) algorithmically represent the use of scientific methods and research techniques in the context of a specific academic discipline and in the procedures for interaction of disciplines of the module;
4) explain the nature of situations in various spheres of social communication based on the content of theories and ideas of scientific fields of the studied disciplines;
5) provide information on various stages of development of the Kazakh society, political programs, culture, language, social and interpersonal relations in a reasoned and reasonable manner;
6) analyze the features of social, political, cultural, psychological institutions in the context of their role in the modernization of Kazakhstan's society;
7) analyze different situations in different spheres of communication from the point of view of correlation with the system of values, social, business, cultural, legal and ethical norms of Kazakhstan society;
8) distinguish strategies of different types of research in society and justify the choice of methodology for the analysis of specific problems;

9) to assess the specific situation of relations in society from the standpoint of a particular science of social and humanitarian type, to design the prospects for its development, taking into account possible risks;
10) develop programs for resolving conflict situations in society, including in professional society;
11) carry out research and project activities in various areas of communication, generate socially valuable knowledge, present it;
12) correctly Express and argumentatively defend their own opinion on issues of social significance.

Physical Culture
CODE-KFK 101
CREDIT – 6 (2/1/0/3)
PREREQUISITE – none_____

PURPOSE AND TASKS OF THE COURSE

As part of the course, the student will master the practical use of the skills of performing the main elements of athletics, sports games, gymnastics and a set of standards for General physical training, including professional and applied physical training or one of the sports, methods of conducting independent physical exercises.

BRIEF DESCRIPTION OF THE COURSE

The main knowledge and skills in the field of physical culture and sports will be presented, as well as methods of building and rationing the load during independent classes; methods of compiling complexes of hygienic gymnastics and General development exercises;
The final stage of the course is a multivariate test and / or the implementation of the established standards for General physical, sports and professional applied training.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

After completing the course, the student must understand the role of physical culture and a healthy lifestyle; know the basics of physical culture and a healthy lifestyle; possess a system of practical skills and abilities that ensure the preservation and promotion of health, development and improvement of psychomotor abilities and qualities.

The student must be able to:

- dose the load during recreational and independent physical exercises;
- evaluate the volume and intensity of physical activity, taking into account age and health status;
- use the methods and means of PPFP;
- to use a set of exercises on OFP, SFP and include sports and outdoor games, national games.

At the end of the course, the student should know:

- the purpose and objectives of physical training;
- content of training sessions;
- rules for building and rationing the load during independent classes; - rules and methods of drawing up complexes of hygienic gymnastics and General developmental exercises;
- focus of professional and applied physical training;
- sets of exercises on OFP, SFP and the content of games used in practical classes.

Production practice 1, 2
CODE – AAP109, AAP103
CREDIT – 2 / 4
PREREQUISITE – none

PURPOSE AND OBJECTIVES OF THE COURSE

The objectives of the practice for obtaining professional skills and experience of professional activity are:

- preparation of the student for the implementation of professional activities;
- consolidation of knowledge gained in the framework of theoretical training;
- acquisition of skills and experience of independent work.

tasks:

- checking the possibilities of independent work of the future bachelor in the conditions of a specific organization;
- mastering the basic practical skills of working under the guidance of qualified specialists;
- students gain practical experience of independent work in their chosen specialty;

- collection, processing and analysis of the initial factual material necessary for the completion of the final qualification work;

BRIEF DESCRIPTION OF THE COURSE

The basis for the consolidation of theoretical knowledge and practical skills is a high-quality student's practical training. Despite the fact that the production organization, due to the specifics of the activity, can not always provide the Intern with a variety of types of geodetic works and an appropriate workplace, the student should strive to take the initiative during the production practice and try to collect materials for the future thesis.

From the moment of enrollment of students to practice in labor collectives, they are subject to the General labor legislation, labor protection rules and internal regulations in force at this enterprise or division.

KNOWLEDGE, SKILLS AND ABILITIES AT THE END OF THE COURSE

In the course of practical training to obtain professional skills and experience of professional activity, the student must have the following General cultural, General professional and professional competencies:

- ability to work in a team, tolerant of social and cultural differences;
- ability to self-organization and self-education;
- the ability to search, store, process and analyze information from various sources and databases, present it in the required format using information, computer and network technologies;
- ability to use knowledge of modern technologies of design, geodetic, cadastral and other works related to land management and cadastres
- ability to use knowledge of modern technologies of collection, systematization, processing and accounting of information about real estate objects in modern geographical and land information systems;
- the ability to use the knowledge of modern technologies in conducting surveying, geodetic, land management and cadastral works;
- ability to use knowledge of modern methods and technologies for monitoring land and real estate;
- ability to use knowledge of modern technologies of technical inventory of capital construction objects.

Training practice
CODE-AAP101
CREDIT – 2
PREREQUISITE – none

PURPOSE AND PURPOSE OF THE COURSE

The purpose of passing the educational geodetic practice of students is:

1. Getting the evaluation of professional competence;
2. Mastering practical skills and skills of working with devices, consolidating theoretical knowledge gained during training;
3. Development of skills of conducting independent work, calculation and graphic works, as well as skills of drawing up reports;
4. Ability to work in a team, perform joint field work, protect the report.

BRIEF DESCRIPTION OF THE COURSE

Educational geodetic practice is conducted for students of the 1st year, on the territory of the organization of education, training grounds. Methodological and material preparation of practical training sessions is carried out by the teacher leading this practical lesson.

Attendance and recording of the progress of the training practice is recorded by the teacher, at the end of the training practice, the student is evaluated.

KNOWLEDGE, SKILLS AND ABILITIES AT THE END OF THE COURSE

Following the results of the educational geodetic practice, students acquire primary knowledge in the field of geodesy.

acquire the following skills: conducting business correspondence, acquiring practical skills in performing calculations and compiling reports.

acquires skills: working with geodetic instruments in the field, the progress of work, teamwork, protection of reports.

12 Defense of the thesis/graduation project
CODE – ECA 002
CREDIT – 4
PRE-REQUISIT – none

PURPOSE AND TASKS OF THE COURSE

The purpose of the thesis (project) is:
1) systematization, consolidation and expansion of theoretical knowledge and practical skills in the specialty and their application in solving specific scientific, technical, economic and production problems, as well as cultural tasks; 2) development of skills in conducting independent work and mastering the methodology of scientific research and experimentation in solving developed problems and issues; 3) clarification of the student's readiness for independent work in the conditions of modern production, science, technology, culture, as well as the level of his professional competence.

BRIEF DESCRIPTION OF THE COURSE

Thesis (project) is a written graduate work, which is performed at the final stage of training, if it is provided for by the state compulsory education standard and the curriculum of the specialty.

The thesis (project) is a generalization of the results of independent study and research of the actual problem of a specific specialty in the corresponding branch of science.

The thesis (project) is carried out under the supervision of a scientific supervisor and must meet one of the following requirements:

1) summarize the results of research, design solutions,

conducted by scientists, analysts, practitioners: engineers, designers, managers, economists; 2) contain scientifically grounded theoretical conclusions on the object under study; 3) contain scientifically based results, the use of which ensures the solution of a specific problem.

Students who have successfully mastered the theoretical undergraduate course in the amount of at least 240 credits are admitted to the thesis (project).

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

Based on the results of training, graduates of educational programs acquire knowledge in the field of: the basics of architectural design of buildings and structures, the basic physical and mechanical properties of materials, methods of engineering research in construction, the basics of creating engineering systems, basic concepts of laws, methods of engineering mechanics, the basics of economic theory, industry economics , management and marketing, accounting and audit, labor protection, safety, environmental legislation, in the field of technology, organization, mechanization and automation of construction production, methods of theoretical and experimental research of building structures;

acquire the skills: use of regulatory and legal documents in the field of construction, conduct a dialogue-dialogue in the state and foreign languages, using the rules of speech etiquette, read special literature without a dictionary in order to search for information, translate texts with a dictionary, compose annotations, abstracts and business letters into in a foreign language, perform calculations of structures of buildings and structures;

acquires skills: knowledge of the basics of architectural and construction design, use of modern methods of inspection and testing of structures, work with software products, knowledge of the state language, the language of international communication, the lexical and grammatical minimum of one of the foreign languages, etc.

Appendix A

Рецензия

на рабочую учебную программу

«ГЕОПРОСТРАНСТВЕННАЯ ЦИФРОВАЯ ИНЖЕНЕРИЯ»

для подготовки бакалавров техники и технологий
в области геодезии, картографии, землеустройства и кадастра

Во многих отраслях промышленности Казахстана внедряются цифровые технологии промышленного производства. В настоящее время в области геодезии, картографии, землеустройства и кадастра на передний план вышли инновационные технологии, обеспечивающие максимально эффективные сбор и обработку геопространственных данных, в первую очередь, глобального уровня пространственного охвата. К таковым технологиям профессиональное сообщество относит геоинформатику (ГИС); дистанционное зондирование Земли (ДЗЗ) воздушного и космического базирования, включая лазерное сканирование; глобальные навигационные спутниковые системы (ГНСС). Использования современных геопространственных технологий создают для принятия управленческих решений научных и практических задач соответствующий массив информации.

Зарубежная и отечественная практика внедрения современных геопространственных технологий выявила ряд общих проблем, которые особенно связаны с использованием больших объемов данных и их анализом для задач управления: обеспечение качества данных и понимание приоритетных задач для любого приложения; интеграция данных из нескольких организаций и различных сред. Это одна из трудных задач в мире информационных технологий; использование широкого спектра интеллектуальных устройств. Многие предприятия в различных отраслях экономики, в академических кругах и университетах строят более глубокие отношения по использованию геопространственных технологий, в частности, в геодезии и картографии.

Поэтому считаем, что миссия образовательной программы по направлениям: 6В07303 – «Геопространственная цифровая инженерия» (Геодезия и картография); 6В07304 – «Геопространственная цифровая инженерия» (Землеустройство и кадастр) заключается в подготовке и обеспечение качественного роста человеческого капитала региона в сфере геодезии и картографии, кадастра и землеустройства, посредством развития инновационной, научно-образовательной среды и подготовка в соответствии с потребностями рынка высококвалифицированных кадров, обладающих высокими личностно-профессиональными компетенциями.

Образовательная программа **«Геопространственная цифровая инженерия»** является основой в повышения качества трех уровней системы высшего образования. За счет квалификационного модуля и выпускной квалификационной работы бакалавров образовательной программы **«Геопространственная цифровая инженерия»** создается база для последующей магистерской программы, а затем и программы докторантуры.

Часть выпускников, получив квалификацию «Бакалавр», непосредственно включаются в трудовую деятельность в качестве линейного персонала в гражданское и промышленное строительство, военно-промышленный комплекс, государственные органы в области управления земельными ресурсами, проектно-изыскательские институты, бюро, фирмы, выполняющие топографо-геодезические, аэрофотограмметрические, инженерно-изыскательские и картосоставительские работы. «Бакалавр» рассматривается в основном как промежуточная ступень и предпосылка для перехода к дальнейшему циклу высшего образования по программе «магистр». Выпускники бакалавриата университета имеют возможность продолжить обучение в магистратуре по полученной или смежной специальности на грантовой формы обучения или платной основе.

В связи с вышеизложенным считаем, что образовательная программа «Геопространственная цифровая инженерия» для бакалавров техники и технологий в области геодезии, картографии, землеустройства и кадастра высоко оцениваем по сущности, отвечает современным требованиям в системе высшего образования и рекомендуется для внедрения в учебный процесс.

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Appendix B

ОТЗЫВ

экспериментально-образовательную программу «Геопространственная цифровая инженерия» кафедры «Маркшейдерское дело и геодезия» Казахского Национального исследовательского технического университета имени К.И.Сатпаева

Экспериментально-образовательная программа «Геопространственная цифровая инженерия» разработана на основе РУПа специальностей утратившего силу Классификатора специальностей: 5В071100 – «Геодезия и картография», 5В090300 – «Землеустройство», 5В090700 – «Кадастр».

Объем программы соответствуют государственным стандартам образования и типовым учебным программам технических специальностей и содержит перечень дисциплин по модулям: общеобразовательный, общеинженерный, инженерно-технический, профессиональный.

Программа составлена согласно трех уровней системе структуры высшего образования в РК, где данная программа «Геопространственная цифровая инженерия» относится к первому уровню высшего образования. За счет квалификационного модуля и квалификационной работы бакалавров6 далее создается магистерская программа, а затем и программы докторантуры.

Миссия ОП «Геопространственная цифровая инженерия» специальностей: 5В071100 – «Геодезия и картография»; 5В090300 – «Землеустройство»; 5В090700 – «Кадастр» заключается в обеспечение качественного роста человеческого капитала региона в сфере геодезии и картографии, кадастра и землеустройства, посредством развития инновационной, научно-образовательной среды и подготовка в соответствии с потребностями рынка высококвалифицированных кадров, обладающих высокими профессиональными компетенциями.

Приведены Цели и задачи программы:

-подготовка выпускника к организационной деятельности, как члена общества, исполнению правой и законодательной системы Республики Казахстан с высоким уровнем профессиональной культуры, гражданской позиции;

- подготовка выпускника к деятельности по постоянному самосовершенствованию и саморазвитию, овладению новыми знаниями, умениями и навыками по инновационным направлениям геодезии и картографии;

- подготовка выпускника с приобретенными компетенциями выполнения расчетов элементов геодезии и картографии, оформления технических решений, участия в разработке технических заданий на топографо-геодезические и картографические работы на основе современной учебной материально-технической базы;

- подготовка выпускника компетентного в производственно-управленческом, проектно-конструкторском, организационно-технологическом и научно-педагогическом направлениях, на основе современных обучающих средств информационных технологий и ресурсов.

На основании вышеизложенного программа «Геопространственная цифровая инженерия», разработанная кафедрой «Маркшейдерское дело и геодезия» Сатпаев университета соответствует требованиям, предъявляемым к учебным программам и рекомендуется для студентов высших учебных заведений.

Президент ТОО «Leica Geosystems Казахстан» _____ Кочетова М.А.