

Institute of Architecture and Construction named after T.Basenov Department of Engineering Systems and Nets

EDUCATIONAL PROGRAM 7M11201 Occupational health and safety at work

Code and classification of the field of education: <u>7M11 Services</u> Code and classification of training directions: <u>7M112 Occupational health and</u> <u>safety at work</u> Group of educational programs: <u>M150 Sanitary and preventive measures</u> Level based on NQF: 7 Level based on IQF: 7 Study period: <u>2</u> Amount of credits: <u>125</u>

Almaty 2023

Educational program 7M11201 Occupational health and safety at work was approved at the meeting of K.I. Satbayev KazNRTU Academic Council

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was reviewed and recommended for approval at the meeting of K.I. Satbayev KazNRTU Educational and Methodological Council

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Educational program 7M11201 Occupational health and safety at work was developed by Academic committee based on direction «Labor safety»

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List of abbreviations and designations

NAO KazNRTU named after K.I.Satpayev - NAO "Kazakh National Research Technical University named after K.I.Satpayev";

SOSE - State obligatory standard of education of the Republic of Kazakhstan; **EP** - educational program;

IWS - independent work of a student (student, undergraduate, doctoral student);

IWSP - independent work of a student with a teacher (independent work of a student (undergraduate, doctoral student) with a teacher);

WC - working curriculum;

QED - catalog of elective disciplines;

VK - university component;

KV - component of choice;

NQF - National Qualifications Framework;

SQF - Sectoral Qualifications Framework;

RO - learning outcomes.

1. Description of educational program

The educational program of the master's program in the direction of preparation 7M11201 - "Hygiene and labor protection at work" was developed by the Kazakh National Research Technical University named after K.I. Satbayev and provides an opportunity to obtain in-depth knowledge, key skills and abilities of the graduate and his further development in the field of labor protection and industrial safety, protection in emergencies. This EP is built taking into account the possibility of providing a master student with a choice of an appropriate educational trajectory or a specific specialization, based on the main educational program, but containing its own individual competencies, reflecting the specifics of a particular specialization in the direction 7M112 "Hygiene and labor protection in production".

2. Purpose and objectives of educational program

Purpose of EP: The purpose of the educational program 7M11201 - "Occupational Health and Safety at Work" is to train highly qualified masters of technical sciences with fundamental scientific knowledge in the field of occupational health and safety, industrial safety, emergency protection, capable of implementing the acquired knowledge in design, engineering, production and technological, research, organizational and managerial and scientific and pedagogical activities.

Tasks of EP: - selection and calculation of the main parameters of human and environmental protection means in relation to specific conditions based on known methods and systems;

- calculation and design work to create means of ensuring safety, saving and protecting a person from technogenic and anthropogenic impacts;

- development of sections of projects related to security issues;

- engineering and design and author's support of scientific research in the field

of safety and technical implementation of innovative developments;

- optimization of production technologies in order to reduce the impact of negative factors on humans and the environment;

- conducting an economic assessment of the developed protection systems or proposed technical solutions;

- preparation of terms of reference for the development of design solutions in the field of hygiene and labor protection, protection in emergency situations;

- carrying out calculations for projects, a feasibility study of planned solutions;

- development of methodological and regulatory documents, technical documentation;

- examination of projects and the state of facilities for labor safety and protection in emergency situations;

- selection of life safety systems, fire, chemical, biological and other production safety;

- designing processes for ensuring hygiene and labor protection, protection in emergency situations;

- formation of the principles of labor protection culture in the organization, development of a system for collecting, analyzing information and exchanging information. Collection of information about human, technical, organizational and environmental factors that determine the safety of the system as a whole;

- development of a planned system of internal standards, operating procedures, instructions and rules.

- carrying out measurements and surveys in the field of safety, planning experiments, processing, analysis and generalization of their results, mathematical and computer modeling, making forecasts;

- compiling descriptions of ongoing research, formulating goals and objectives, preparing data and compiling reports, reviews and scientific publications aimed at improving safety, creating new methods and systems for protecting humans and the environment, determining the plan, the main stages of research;

- choice of research method, development of a new research method;

- creation of a mathematical model of the object, the research process;

- participation in the development and implementation of methods and programs in the field of hygiene and labor protection, protection in emergency situations;

- planning, implementation of the experiment, processing of the obtained data, formulation of conclusions based on the results obtained, development of recommendations for the practical application of the results of scientific research;

- analysis and generalization of research results, publication of results in the form of scientific articles and abstracts of reports, registration of pre-patents and patents for inventions;

- development of innovative projects in the field of security, their implementation and implementation.

- setting goals and formulating tasks for the protection of the environment at the level of the enterprise, territorial production complexes and regions, as well as the activities of enterprises and regions in emergency conditions; - development of operational plans for primary production units;

- maintenance of technical documentation related to professional activities;

- development of organizational and technical measures in the field of security and their implementation, organization and implementation of modern man-made and occupational risk management systems at enterprises and organizations;

- participation as a technical expert in the commercial implementation and purchase of protection systems, new design and engineering developments related to the direction of the profile, taking into account knowledge of the market situation and marketing work in the sales market;

- development of norms and rules in the field of hygiene and labor protection, as well as the establishment of the procedure for their implementation in the course of economic and other activities;

- calculation of the technical and economic efficiency of measures aimed at improving the safety of production and the cost of eliminating the consequences of accidents and disasters for making informed economic decisions.

- teaching disciplines related to labor protection and industrial safety, life safety in colleges and universities;

- management of departments of labor protection and industrial safety, retraining of average technical personnel of services and enterprises;

- development of educational and methodical literature for conducting classes with students.

3. Requirements for evaluating the educational program learning outcomes

Awarded degree/qualifications: A graduate of this educational program is awarded the academic degree "master" in the direction 7M11201 "Hygiene and labor protection at work".

A graduate who has mastered the master's program should have the following general professional competencies:

- the ability to independently acquire, comprehend, structure and use new knowledge and skills in professional activities, develop their innovative abilities;

- the ability to independently formulate research goals, establish a sequence for solving professional problems;

- the ability to put into practice the knowledge of fundamental and applied sections of the disciplines that determine the direction (profile) of the master's program;

- the ability to professionally choose and creatively use modern scientific and technical equipment to solve scientific and practical problems;

- the ability to critically analyze, present, defend, discuss and disseminate the results of their professional activities;

- possession of skills in the preparation and execution of scientific and technical documentation, scientific reports, reviews, reports and articles;

- willingness to lead a team in the field of their professional activity, tolerantly perceiving social, ethnic, confessional and cultural differences;

- readiness for communication in oral and written forms in a foreign language

to solve the problems of professional activity.

A graduate who has mastered the master's program must have professional competencies corresponding to the types of professional activities that the master's program is focused on.

Design activity:

- the ability to perform complex engineering and technical developments in the field of safety;

- the ability to predict, determine areas of increased technogenic risk and areas of increased pollution;

- the ability to optimize the methods and means of ensuring human security from the impact of various negative factors in the technosphere;

- the ability to conduct an economic assessment of the effectiveness of the implemented engineering and technical measures.

Production and technological activities:

- the ability to independently carry out production and research and production work in solving practical problems;

- the ability to professionally operate modern equipment and instruments in the field of the mastered master's program;

- the ability to use modern methods of processing and interpreting complex information to solve production problems;

- the ability to independently draw up and submit projects for research and development work;

- readiness to design complex research and scientific and production works in solving professional problems;

- the ability to independently conduct audits and inspections;

- the ability to assess production risks and draw up plans for corrective actions, to have the skills of HAZOP, HAZID methods;

- the ability to conduct incident investigations according to the "five whys" and "tree of reasons" methods.

Research activities:

- the ability to solve professional problems by integrating fundamental and technical sciences and specialized knowledge in the field of hygiene and labor protection, industrial safety, protection in emergency situations, obtained during the development of the master's program;

- the ability to independently conduct scientific research in the professional field, summarize and analyze experimental information, draw conclusions, formulate conclusions and recommendations;

- the ability to create and explore models of the objects under study based on the use of in-depth theoretical and practical knowledge in the field of life safety;

- the ability to analyze, optimize and apply modern information technologies in solving scientific problems;

Organizational and managerial activities:

- readiness to use the practical skills of organizing and managing research and development work in solving professional problems of protecting the environment at the level of the enterprise, territorial production complexes and regions, as well as the activities of the enterprise in an emergency mode;

- readiness for the practical use of regulatory documents in the planning and organization of scientific and production work on safety issues;

- the ability to interact with government services in the field of industrial, fire safety, protection in emergency situations;

- the ability to rationally address issues of safe placement and use of technical means in the regions;

- the ability to apply in practice the theory of managerial decision-making and methods of expert assessments.

Scientific and pedagogical activity:

- the ability to conduct seminars, laboratory and practical classes;

- the ability to participate in the development of interactive teaching methods, educational and methodological documentation, multimedia materials and methods for monitoring learning;

- the ability to participate in the management of the scientific and educational work of students in the field of life safety.

When developing a master's program, all general cultural and general professional competencies, as well as professional competencies related to those types of professional activities that the master's program is focused on, are included in the set of required results for mastering the master's program.

4. Passport of educational program

N⁰	Field name	Comments
1	Code and classification of the field of education	7M11 Services
2	Code and classification of training directions	7M112 Occupational health and safety
3	Educational program group	M150 Sanitary and preventive measures
4	Educational program name	7M11201 Occupational health and safety at work
5	Short description of educational program	The educational program 7M11201 provides an opportunity to obtain in-depth scientific knowledge, research skills and abilities and its further development in the field of labor protection and industrial safety, protection in emergencies
6	Purpose of EP	The purpose of the educational program 7M11201 - "Occupational Health and Safety at Work" is to train highly qualified masters of technical sciences with fundamental scientific knowledge in the field of occupational health and safety, industrial safety,

4.1. General information

12 Learning outcomes of educational program	Investigatingincidentsandpreventingtheirrecurrence,conductingsafetyauditsandinspections.AgraduateuponEP6B112OccupationalHealth
	production risks and developing corrective measures, investigating incidents and
	their functional purpose; - basic skills for assessing
	methods for improving the reliability and stability of technical objects, maintaining
	the ability to implement new
	economic calculations of measures to improve safety; -
	measures to protect a person; the ability to carry out technical and
	in emergency situations various
	- the ability to implement in practice in labor conditions and
	technical measures;
	implemented engineering and
	economic assessment of the effectiveness of the
	- the ability to conduct an
	technosphere;
	of various negative factors in the
	methods and means of ensuring human security from the impact
	- the ability to optimize the
	environment;
	risk and areas of increased pollution of the working
	areas of increased technogenic
	- the ability to predict, determine
	safety;
	engineering and technical developments in the field of life
11 List of competencies of educational program	- the ability to perform complex engineering and technical
10 Distinctive features of EP	-
9 The level based on IQF	7
8 The level based on NQF	7
7 Type of EP	New EP
	and scientific and pedagogical activities.
	organizational and managerial
	technological, research,
	engineering, production and
	knowledge in design,
	emergency protection, capable of implementing the acquired

		and Safety at Work can carry out
		professional activities at
		industrial enterprises of all
		industries of various forms of
		ownership, in institutions and
		organizations with a staff of
		more than 50 people in the
		safety and labor protection
		services, industrial safety,
		departments of the Ministry of
		Emergency Situations Republic
		of Kazakhstan, subdivisions of
		the Ministry of Labor and Social
		Protection of the Population of
		the Republic of Kazakhstan.
13	Education form	full-time
14	Period of training	2
15	Amount of credits	125
16	Languages of instruction	Russian, Kazakh, English
17	Academic degree awarded	magistr
	Developer(s) and authors	

		academi	c disci	pline	es									
N⁰	Discipline name	Short description of discipline	Amoun			G	enerat	ed lear	ning ou	ıtcome	s (code	es)		
			t of credits	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
	-	Cycle of general ed University			ipline	S	1			1	1	1	1	1
	English (professional)	The course is designed for undergraduates of	5	v										v
	Linglish (professional)	technical specialties to improve and develop	5	v										•
		foreign language communication skills in												
		professional and academic fields. The course												
		introduces students to the general principles												
		of professional and academic intercultural												
1		oral and written communication using modern												
1		pedagogical technologies (round table,												
		debates, discussions, analysis of												
		professionally oriented cases, design). The												
		course ends with a final exam.												
		Undergraduates also need to study												
		independently (MIS).												
	History and philosophy	The subject of the philosophy of science, the	3	v										v
	of science	dynamics of science, the specifics of science,												
		science and prescience, antiquity and the												
		formation of theoretical science, the main												
		stages of the historical development of												
		science, the features of classical science, non-												
2		classical and post-non-classical science, the												
		philosophy of mathematics, physics,												
		engineering and technology, the specificity of												
		engineering sciences, the ethics of science,												
		social and moral responsibility of a scientist												
		and engineer.												
	Pedagogy of higher	The discipline is a continuation of	3	v										v
3	education	Mathematics 1. The sections of the course												
		include elements of linear algebra and												

4.2. Relationship between the achievability of the formed learning outcomes based on educational program and academic disciplines

4	Psychology of management	analytic geometry. The main questions of linear algebra are considered: linear and self- adjoint operators, quadratic forms, linear programming. Differential calculus of a function of several variables and its applications. Multiple integrals. The theory of determinants and matrices, linear systems of equations, as well as elements of vector algebra. Includes elements of analytical geometry in the plane and in space. The course is aimed at teaching undergraduates the basics of management psychology. It will consider the specifics of management psychology, psychological patterns of management activities, personality and its potential in the management system; motivation and performance in the organization, leadership and leadership in modern management of organizations, a social group as an object of management, the psychological basis for making managerial decisions, business communication and managerial conflicts, the psychology of	3	v		v				
		responsibility, creating an image as an integral part of the culture of communication,								
		the psychology of advertising.								
		Cycle of basic di Optional com		i						
5	State policy in the field of BC	Knowledge of the state policy in the field of life safety, carried out in the field of protecting the population and territories from natural and man-made emergencies on the basis of a unified state system of civil protection.	5			v			v	
6	State policy in the field of industrial and	Knowledge of state policy, state management and state supervision, carried out by	5			v			v	

	environmental safety	authorized bodies in the field of industrial and									
	5	environmental safety for sustainable socio-									
		economic development									
	Methodology for	Formation of knowledge, skills and abilities	5		v			v			
	conducting scientific	that allow the practical use of modern									
	research in the	methods of scientific research in the field of									
7	Belarusian Railways	life safety and the necessary competencies for									
		the successful implementation of research,									
		design, organizational and management									
		activities in the same area									
	Methodological	Formation of knowledge and skills among	5	v				v			
		undergraduates for successful pedagogical									
	training	activity on life safety as a science based on									
8		the methodology of teaching the discipline,									
Ũ		with the provision of theoretical knowledge									
		and practical skills necessary for									
		methodological work to cover the issues of									
		creating safe and harmless living conditions.									
		Knowledge of professional computer	5	v				v			
	the Belarusian Railways	programs for their qualified application in									
9		practice, provision of modern management of									
		production processes that prevent industrial									
		injuries, occupational diseases, accidents,									
	Modern scientific	fires.	5								
	research in the field of	The study of topical problems in the field of scientific and innovative activities,	5			v				v	
	technosphere and	acquaintance with the achievements of world									
	environmental safety	and domestic science and the practice of									
	environmental safety	managing innovative processes in the field of									
10		technosphere and environmental safety.									
10		Formation of a holistic view of the									
		mechanisms for managing scientific and									
		innovative processes; bases for self-study and									
		mastery of the mechanisms for managing									
		scientific and innovative processes.									
	•	^									
							1				

		Cycle of maj University									
11	Security issues in projects	Formation of generalizing theoretical knowledge and practical experience in organizational safety management in projects. The use of a single concept, methods, techniques and tools as the most important security mechanisms in projects aimed at coordinating the efforts of all project participants.	5					V	V		
12	Scientific and methodological foundations of industrial safety	Basic principles, goals and objectives of scientific and technical policy and research activities in the study of industrial safety. Scientific analysis of human security problems and methods of their solutions at the individual, professional, national and global levels in fundamentally new post-industrial conditions.			v					v	
13	Carrying out a special assessment of safety and comfort of working conditions	Formation of knowledge in the field of conducting a special assessment of the safety and comfort of working conditions in accordance with the standards for hygienic assessment of existing conditions and the nature of work, assessing the safety of workplaces, assessing the provision of workers with personal protective equipment; ability to use legal documents that determine the procedure for conducting work on a special assessment of the safety of production facilities.	5					v	v		
14	Examination of technosphere and environmental safety	The discipline contributes to the formation of legal and regulatory principles of technosphere and environmental expertise, reveals modern problems of ecology and nature management; risk classification; main approaches to risk management in modern	5		v	v					

		economic conditions; ecological state of the environment; quantitative risk assessment; methods of analysis and evaluation of technological schemes of enterprises for the formation of a waste-free scheme Цикл профилиру Компонент		ин						
15	Integrated Security Management Systems	Theoretical and practical foundations of integrated health and safety management systems to eliminate or minimize risks for workers and other interested parties whose health may be exposed to hazards associated with their activities.	5			v		v		
16	International Law and Security Cooperation	Providing deep fundamental knowledge about the activities of international organizations in the field of international legal regulation of labor, the study of modern trends in legal regulation in international labor law, taking into account the laws of historical development, the formation of skills for applying the acquired knowledge in professional activities	5		*		v			
17	Modeling in the technosphere safety forecasting system	Studying the methodology of system thinking and comprehensive consideration of complex problems, acquiring knowledge and skills in multi-aspect modeling, acquiring knowledge in the field of modeling real processes and phenomena that underlie the safety of technical systems, acquiring the skills to use the acquired knowledge in practical work.	5	v				v		
18	Organization and conduct of work on liquidation and assessment of the consequences of emergencies	The purpose of the study: to prepare undergraduates to solve organizational and managerial tasks to ensure industrial safety, increase the sustainability of industry facilities and life support of the population in emergency situations, for which it is	5		v			v		

	necessary to study the sustainability of economic objects and the principles of the formation of technosphere regions; dangerous technologies and productions; study of the stability of the functioning of the object of the economy and assessment of the possible situation in the organization in case of natural disasters, accidents, catastrophes; organization of protection of production personnel and material and technical means at chemical, radiation, explosion and fire hazardous enterprises and ways to minimize the risk of emergencies.								
assessment of the technogenic impact of	Formation of knowledge necessary to reduce the negative impact of the technosphere on the natural environment through the rational and integrated use of raw materials and energy resources or when creating new environmental protection devices and technologies, environmentally friendly production processes, when combining and cooperating industries, as well as when developing an environmental strategy and development policy production.	5	v			v			
	Training of certified specialists who have the right to work as a manager or a person responsible for ensuring safety and labor protection in organizations of any form of ownership in the territory of the Republic of Kazakhstan.	5			v			v	
Occupational Health and Safety Management System OHSAS 18001	Formation of ideas about the identification of hazards and the control of risks to the health and safety of personnel and other persons located on the territory and / or working on behalf of the organization; reducing the likelihood of accidents, accidents and other	5			v			v	

	incidents; compliance with legal and regulatory requirements and improving the overall efficiency of the work of the staff.							
Modern research in the field of BJD	The study of modern patterns of emergence and development of threats and dangers and ways to effectively protect society (a person, his communities, humanity) and his environment from them in any conditions of life.	5		v	v			
	Formation of knowledge about the general methods for designing systems for protecting the environment from radiation, electromagnetic, noise, chemical pollution, air exchange and lighting systems, identifying potential hazards in production, performing risk assessments and developing appropriate corrective measures in the field of using protective equipment and technologies.	5		v		v		
Sustainable functioning of economic facilities in emergency situations	Acquisition of practical skills necessary to systematize scientific research to solve organizational and managerial tasks to ensure industrial safety, increase the stability of industry facilities and life support for the population in emergency situations, taking into account modern requirements; identification of hazards, their sources, levels and causes of occurrence, typical for the most energy-intensive industries and processes; development of the main directions of preventive measures to improve the stability of potentially hazardous industries in emergency situations.	5				v	v	

5. Curriculum of educational program

				ADOD VECT	INICAL UNIV	ERSITY name	a utres fisha	PATER PATER	Connectory		
S	SATBAYEV UNIVERSITY	of Educa	utional Pro	CU ogram on e	RRICULUM arollment for 201 – «Derut	2023-2024 a	cademic y et	Reduction of the second	W BUT III		r K.Satj
		roup of Ed	f study: 2 ;	programs	M150 – «Sani	tary and pre	Academic d	egree: maste	r of technic	al scienc	es
Discipline	Name of disciplines	Cycle	Total amount in credits	Total hours	Classroom amount lec/lab/pr	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training base courses and semesters Loourse 2 course 1 semester 2 semester 3 settlester 4 s			
1962	F BASIC DISCIPLINES (BD) M	-1. Modu	le of basic	training (un	liversity con	iponent)				
NG230	Coglish (professional)	BD UC	5	60	8.0/2	30	E	5	1		-
1UM214	Starzgament Psychology	BOUC	3	90	12021	50 60	E		3		
	History and philosophy of science Higher school pedagogy	BD UC BD UC	3	90	1/0/1	60	E	3		1	_
10 1213	upas server productif			com	ponent of ch	oice	-	5			1
SAF219	Mothods of conducting scientific research in life sufery	BD CCH	,	150	1/0/2	105	Е				
SAF228	Methodological foundations of life			-		-		5			
SAF233	Modern scientific research in the field of reclinosphore and environmental safety Professional programs in life	вр ссн	5	150	1/0/2	105	E				
SAF220	safety									5	-
SAF201	State policy in the field of life rafety	BD CCH	5	150	1.0/2	105	ε				
SAF224	State policy in the field of industrial and environmental cafety	abcen			ROFILE DIS	CIDUINES	(PD)			1	_
		Modula	CYC.	onal activi	ity (universit	y composes	t, compone	nt of choice)			
SAF215	Conducting a special assessment of the safety and comfort of	POUC	5	150	1/0/2	105	E	5			
	working combiness Scientific and methodological	00.00	5	130	1.0/2	105	E	5			
SAF200	bases of industrial safety	PD-DC		150	1/0/2	105	E	-	5		
SAF227	Security issues in projects	PDUC	5			105	E			1	
SAF237	Technosphere and environmental safety expertise	PDUC	5	150	1/0/2	105	-		-	-	5
SAF213	Conducting research and assessment of the technogenic impact of industrial enterprises on the environment	PD CCH	5	150	102	105	E				
SAF235	situations					-	-	_		-	-
SAF227 SAF229	International law and security cooperation Modeling in the technosphere safety forecasting system	PD CCH	5	150	1.0/2	105	E		9		
SAF209	Modern research in the field of life safety	e PD CCF	5	150	1/0/2	105	E		5		
\$AF218	protection in the technicipinere						-			-	_
SAF231	18001 Organization and performance of	- 10 00	4 5	150	1.9/2	105	E				5
SAP21	emergencies consequences	-		-	-					-	
	Certified State Course on Occupational Safety and Health										5

				M-3. Pr	actice-orien	ed module	 1			
AAP229	Pedapopical practice	BDUC	0				 	ő		
AAP269	Research practice	PD, CCH	8							8
		1.00	M	-4. Expe	rimental res	earch module	 			_
AAP253	Research work of a master's inadem, including intenship and completion of a master's thesis	RWMS UC	2				2			
AAP241	Research work of a master's student, including internship and completion of a master's thesia	RWMS UC	3					3		
AAP254	Research work of a massw's student, including internship and completion of a mester's thesis	RWMS UC	5	-					5	
AAP269	Research work of a mester's stadent, including uttenship and completion of a master's thesis	RWMS UC	14							14
				M-5. M	odule of fina	attestation				-
CA212	Preparation and defense of a master's thesis	FA	8				30	20	30	8

	Number of credits for the ent	ire perio					
	Cyzles of disciplines	Credits					
Cyck role			aniversity component (DC)	component of choice (CCB)	Teest		
BD	Cycle of basic disciplines		20	15	35		
PD	Cycle of profile disciplines		28	25	53		
112	Total for theoretical training:	0	48	49	88		
	RWMS				24		
EA	Find instation	8		Contract St	8		
EA	TOTAL:	8	48	40	120		

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Decision of the Educational and Methodological Council of Kazntu named after K.Satpayev. Protocol Ns_36_er "__17_"_11___2022___y.

Decision of the Academic Counteil of the Institute______ Protocol No 2 or "44. 10 2022 y.

Vice-Rector for Academic Affairs

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Department Head

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