Application area

Designed for the implementation of the training of masters in the modular educational program "Electrical engineering " in the NJSC "Kazakh National Agrarian University"

Regulations:

Law of the Republic of Kazakhstan On Education Astana, Akorda, July 27, 2007 No. 319-III3PK (with amendments and additions as of 01.01.2019)

State compulsory standard of higher and postgraduate education. Approved by the Resolution of the Government of the Republic of Kazakhstan dated October 31, 2018 No. 604

Classifier of areas of training with higher and postgraduate education No. 569 13.10.2018;

Standard rules for the activities of educational organizations implementing educational programs of higher and (or) postgraduate education, Ministry of Education and Science of the Republic of Kazakhstan dated October 30, 2018 No. 595.

Rules for organizing the educational process on credit technology of education. Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 563 dated October 12, 2018.

Industry qualifications framework

The "Energy industry" industry. Approved by Protocol No. 05-13-3-4 / PR of July 25, 2019 of the Industry Commission for Social Partnership and Regulation of Social and labor relations in the electric power industry.

Professional standard. " Technical design of innovative products/services " approved by the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated 24.12.2019No. 259.

Professional standard. "Legal support for an innovative project" approved by the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated 24.12.2019No. 259.

Atameken NChE website http://atameken.kz/

1. Passport of the educational program

Education area code and classification	7M07 – Engineering, manufacturing and construction industries
Kode and classification of training areas	7M071 – Engineering and engineering trades
Name of the educational program	«7M07132– Electrical engineering»
Type of educational program	Acting
Purpose of the educational program	Preparation of highly qualified graduates for design and engineering and organizational and managerial activities related to personnel management, design and implementation of new equipment and technologies in the electric power industry for state, local, regional, and foreign institutions.
ISCED level	7
NQR level	7
ORC level	7
Number of the application to the license for the direction of training	KZ42LAA00006720 №10 from July 05, 2019
Accreditation of EP	Certificate №2020 KE 0281 Kaz SEE 23.12.2020 -22.12.2025 г.
Name of the accreditation body	Master of engineering and technology in the educational program «7M07132- Electrical engineering»
The period of validity of accreditation	Table 2
Degree awarded	A graduate can carry out professional activities in the following areas: - laboratory engineer - Energy Engineer, - master, - Leading Specialist, - senior engineer, - Lead Engineer, - the head of the structural unit, - Deputy head of the shop.
Learning outcome	All branches of the industry for the production, transmission, distribution and consumption of electricity, the agro-industrial complex, state bodies for energy supervision and control, supervision of labor safety.
List of qualifications and positions	The sphere of professional activity is the field of science and technology, which includes a set of technologies, means, methods and methods of human activity aimed at creating conditions for the production, transmission, distribution and consumption of electricity. The objects of professional activity of graduates are enterprises for the production, transmission, distribution and consumption of electricity: power supply systems for objects of various sectors of the economy; electric power systems, power plants and substations; electrotechnical equipment of economic sectors, control systems for production and technological processes of industrial enterprises and energy enterprises, research, design and engineering organizations

Field of professional activity	The educational program "7M07132- Electrical engineering " includes 2 (two) educational trajectories: # 1. OT "Electrotechnology and electrical equipment" The professional activity of the master is aimed at: Development, design, as well as, improvement and improvement of technical and economic indicators of power plants and substations, electrical systems and networks, relay protection and automation of power systems, power supply of enterprises of various industries, power supply of agricultural enterprises, electromechanics, electrical insulation and cable equipment, electrical installations and systems, lighting equipment and light sources, electric transport, electrical equipment for vehicles, electric drive and automation of technological complexes. metrological verification of the main instruments for measuring the parameters of power plants and substations, electrical systems and networks. # 2. OT "Energy Saving" The professional activity of the master is aimed at: Increasing the efficiency of energy consumption, implementing and monitoring energy saving in all sectors, as well as modernizing and improving the technical and economic indicators of power plants and substations, electrical systems and networks, power supply of enterprises of various industries, power supply of agricultural enterprises, non-traditional and renewable energy sources, electromechanics , electrical installations and lighting systems, electric transport, electrical equipment of vehicles through the introduction of knowledge of the current state and trends in the development of energy, methods and means of ensuring reliable and effective energy saving
Sphere and object of professional activity	Masters in the direction of training 7M071 - "Engineering and Engineering trades " can perform the following types of professional activities: 1. Design and technological: - determination of the composition of electrical equipment and its parameters, schemes of electric power facilities; - ensuring compliance with all specified parameters of the technological process and the quality of the manufactured products; - carrying out technical, economic and environmental analysis of installations and systems; 2. Organizational and managerial: - organization of the work of the team of performers; selection of a solution that meets various requirements (cost, quality, safety and deadlines), both in long-term and short-term planning; - assessment of production and non-production costs to ensure a given level of product quality; implementation of technical control, testing and quality management in the production process.
Functions of professional activity	- in the field of experimental research methodology;

	- in matters of innovative technical and technological production in all industries, including agriculture; - in the field of technical, economic and environmental analysis of installations and systems; - in performing experimental research in the professional field.

2. Learning outcomes for EP

Codes	Learning outcomes
RL1	Develop effective management strategies and methods based on management psychology and scientific research in the field of energy, including the analysis, design and optimization of management systems, as well as the resolution of legal and ethical issues related to personnel management and intellectual property.
RL 2	Use a foreign language to communicate and present the results of professional activities in an international environment.
RL 3	Develop mathematical models with subsequent analysis and optimization of processes in energy devices and systems to improve their efficiency, reliability and sustainability during design and operation.
RL 4	Design electrical installations for irradiation and supplementary lighting in order to optimize growth processes and increase the efficiency of production in various branches of agriculture, including conducting patent information research related to the creation and application of technical solutions in the field of irradiation and supplementary lighting of agricultural products, while observing legal issues related to the protection of intellectual property.
RL 5	To systematize information on modern methods of electrophysical and electrochemical processing of materials, with subsequent determination of optimal processing parameters and development of recommendations for the implementation of these technologies in production processes in order to improve product quality and optimize costs.
RL 6	Apply modern control systems for technological equipment to optimize technological processes, analyze their efficiency, and develop solutions using modern trends in the field of IoT, artificial intelligence, and machine learning.
RL7	Apply energy management and energy audit methods to analyze the state of the enterprise's energy system with subsequent application of new innovative solutions in the field of energy saving and energy reliability to improve the energy efficiency of the enterprise.

3. Content of the modular educational program

Module code	Module name	Discipline cycle	Discipline component	Code of subject	Subject name	Academic credits	Control in the academic period			Volume of hours							Distribution of credits per academic period	
							Exams	Practice/SRW	Term paper/project	Total	In-class learning	including			MS IWT	MS IW	1 course	
												Lectures	Practice	Lab practicals			1	2
																	Number of weeks in the academic period	
																	15	15
Магистранттың/докоранттың ғылыми-зерттеу жұмысы/Научно-исследовательская работа магистранта/докоранта/Research work of a master's/doctoral student																		
1	Магистранттың эксперименттік-зерттеу жұмысы (МЭЗЖ)/Экспериментально-исследовательская работа магистранта (ЭИРМ)/Experimental research work of a master's student (ERWMS)	ҒЗЖ НИРRW	ЖКВКCU	MEZZhM/EIRME/ERWOME 5501	Магистранттың эксперименталды - зерттеу жұмысы (МЭЗЖ)/Экспериментально-исследовательская работа магистранта (ЭИРМ)	13		120		390.0		0	0	0	0	270		13.0
Мамандық/білім беру бағдарламасы модульдері/Модули специальности/образовательной программы/Modules of specialty/education programm																		
2	Электр энергетикалық жүйелердегі сенімділікті модельдеу және электр желілерін пайда/Моделирование надежности в электроэнергетических системах и эксплуатация электрических сетей/Reliability modeling in electric power systems and operation of electric networks	БеППДAS	ЖКВКCU	EEGZA/MNIE/MOSRITEPI 5314	Электр энергетикасындағы ғылыми зерттеулердің әдіснамасы./Методология научных исследований в электроэнергетике./Methodology of scientific research in the electric power industry.	5	1			150.0	45.0	15	30	0	30	75	5.0	
3		БеППДAS	ЖКВКCU	EKZhUMM/MMPEUS/MMOPIEDAS 5308	Энергетикалық құрылғылар мен жүйелердегі үрдістерді математикалық модельдеу./Математическое моделирование процессов в энергетических устройствах и системах./Mathematical modeling of processes in energy devices and systems.	5	1			150.0	45.0	15	30	0	30	75	5.0	

4		БП БД BS	ТК КВ ES	EESTBA/ MAONE/M OAAEORI TEPI 5205	Электр энергетикасындағы сенімділікті талдау және бағалау әдістері./Методы анализа и оценки надежности в электроэнергетике./Methods of analysis and evaluation of reliability in the electric power industry.	4	2			120.0	45.0	15	30	0	15	60		4.0
5				EUEMEA/ EEE/ESEM AEA 5205	Энергияны үнемдеу, энергия менеджменті және энергия аудиті./Энергосбережение, энергоменеджмент и энергоаудит./Energy saving, energy management and energy audit.		2				45.0	15	30	0	15	60		
6	Ғылыми байланыс және жоғары білімді ұйымдастыру/Научная коммуникация и организация процесса обучения в высшей школе/Scientific communication and organization of the study process in higher education	БП БД BS	ЖК ВК CU	SHTK/IYa P/FLP 5203	Шет тілі (кәсіби)/Иностранный язык (профессиональный)/Foreign language (professional)	2	1			60.0	30.0	0	30	0	15	15	2.0	
7		БП БД BS	ЖК ВК CU	Men/Man 5201	Менеджмент/Management	2	1			60.0	30.0	15	15	0	15	15	2.0	
8		БП БД BS	ЖК ВК CU	BP/PU/PO M 5204	Басқару психологиясы/Психология управления/Psychology of management	2	1			60.0	30.0	15	15	0	15	15	2.0	
9		БеП ПД AS	ЖК ВК CU	OP/PP 5313	Өндірістік практика/Производственная практика/Production Practice	4		40		120.0		0	0	0	0	80		4.0
10	Электр энергетикасындағы технологиялық жабдық/Технологическое оборудование в электроэнергетике/Techn ological equipment in the power industry	БеП ПД AS	ЖК ВК CU	CKZhAEK/ EUDOD/EI FIAL 5309	Сәулелендіруге және қосымша жарықтандыруға арналған электр қондырғылары./Электрические установки для облучения и досвечивания./Electrical installations for irradiation and lighting.	5	1			150.0	45.0	15	30	0	30	75	5.0	
11		БеП ПД AS	ЖК ВК CU	TZhBZZh/ SSUTO/M PCTS 5311	Технологиялық жабдықтарды басқарудың заманауи жүйелері./Современные системы управления технологическим оборудованием./Modern process control technological systems.	5	1			150.0	45.0	15	30	0	30	75	5.0	

12	Электр технологиялық процестер/Электротехнологические процессы/Electrotechnological processes	БеП ПД AS	ЖК ВК CU	МЕГЕНОТ /ЕЕМОМ/ ЕАЕММР 5310	Материалдарды электрлік-физикалық және электрлік-химиялық өңдеу тәсілдері./Электрофизические и электрохимические методы обработки материалов./Electrophysical and electrochemical methods material processing.	5	1			150.0	45.0	15	30	0	30	75	5.0	
1	**Орта білім беру пәндері(ЖБП)/Общеобразовательные дисциплины(ООД)/General education subjects(GER)**					0		0	0	0	0	0	0	0	0	0	0	0
	Міндетті компонент(ЖБП/МК)/Обязательный компонент(ООД/ОК)/Core subjects(GER/CS)					0		0	0	0	0	0	0	0	0	0	0	0
	ЖОО компоненті(ЖБП/ЖК)/Вузовский компонент(ООД/ВК)/University component(GER/UC)					0		0	0	0	0	0	0	0	0	0	0	0
	Таңдау бойынша компонент(ЖБП/ТК)/Компонент по выбору(ООД/КВ)/Electives(GER/ES)					0		0	0	0	0	0	0	0	0	0	0	0
2	**Базалық пәндер(БП)/Базовые дисциплины(БД)/Base requirements(BS)**					10		0	0	300	135	45	90	0	60	105	6	4
	Міндетті компонент(БП/МК)/Обязательный компонент(БД/ОК)/Core subjects(BS/CS)					0		0	0	0	0	0	0	0	0	0	0	0
	ЖОО компоненті(БП/ЖК)/Вузовский компонент(БД/ВК)/University component(BS/UC)					6		0	0	180	90	30	60	0	45	45	6	0
	Таңдау бойынша компонент(БП/ТК)/Компонент по выбору(БД/КВ)/Electives(BS/ES)					4		0	0	120	45	15	30	0	15	60	0	4
3	**Профильді пәндер(БеП)/Профилирующие дисциплины(ПД)/Profession requirements(VRS)**					29		40	0	870	225	75	150	0	150	455	25	4
	Міндетті компонент(БеП/МК)/Обязательный компонент(ПД/ОК)/Core subjects(VRS/CS)					0		0	0	0	0	0	0	0	0	0	0	0
	ЖОО компоненті(БеП/ЖК)/Вузовский компонент(ПД/ВК)/University component(VRS/UC)					29		40	0	870	225	75	150	0	150	455	25	4
	Таңдау бойынша компонент(БеП/ТК)/Компонент по выбору(ПД/КВ)/Electives(VRS/ES)					0		0	0	0	0	0	0	0	0	0	0	0
Оқу жоспары бойынша барлығы/Итого по учебному плану/Total on curriculum						52	9	160	0	1560	360	120	240	0	210	830	31.0	21.0
ОҚ/ ДВО АС	**Оқытудың қосымша түрлері/Дополнительные виды обучения/Additional courses**										0							
ҚА ИА FA	**Қорытынды аттестаттау/Итоговая аттестация/Final attestation**					8				**240.0**								
	Магистрлік жобаны ресімдеу және қорғау (МЖРжК)/Оформление и защита магистерского проекта (ОиЗМП)/Preparation and defense of a master's thesis (PaDMT)					8		2		**240**								
	Барлығы/Итого/Total					**60**		**162**		**1800**	**360**	**120**	**240**	**0**	**210**	**830**		

РЕЦЕНЗИЯ

на образовательную программу
7М07132 — Электроэнергетика»
кафедры «Энергосбережение и автоматика» КазНАИУ

Образовательная программа магистратуры «7М07132 — Электроэнергетика» является актуальной и соответствует требованиям современного рынка труда в области энергетики. Она ориентирована на подготовку высококвалифицированных специалистов, способных решать широкий спектр инженерно-технических и управленческих задач. Особое внимание уделяется не только профессиональным компетенциям, но и навыкам анализа, проектирования и управления, что важно для успешной карьеры выпускников в сфере электроэнергетики.

Достоинства программы

Структура и содержание: программа включает модули, охватывающие как базовые, так и углубленные профессиональные дисциплины. Например, особое внимание уделяется современным проблемам электроэнергетики, энергосберегающим технологиям и инновационным методам автоматизации и управления, что крайне востребовано в текущих условиях энергоперехода.

Подготовка к практической деятельности: в программе отражены направления подготовки специалистов, такие как проектирование и эксплуатация электрооборудования, что позволяет выпускникам быть готовыми к реальной работе в отрасли.

Производственная практика и экспериментально-исследовательская работа: наличие обязательной практики и исследовательской работы способствует не только закреплению теоретических знаний, но и развитию самостоятельности и навыков научного анализа, что особенно ценно для будущих инженеров и управленцев.

Развитие управленческих компетенций: образовательная программа также учитывает потребность в управленческих навыках, необходимых для организации работы в коллективе и решения кадровых вопросов, что позволяет готовить специалистов для руководящих должностей.

Рекомендации по улучшению

Развитие навыков работы в международной среде: для повышения конкурентоспособности выпускников на глобальном уровне целесообразно усилить языковую подготовку, особенно для профессионального общения в международной среде.

Образовательная программа «7М07132 — Электроэнергетика» в целом соответствует требованиям и стандартам подготовки специалистов, необходимых для современного рынка труда в электроэнергетике. Выпускники этой программы будут востребованы как в Казахстане, так и за его пределами, особенно при условии внесения вышеуказанных рекомендаций, что повысит их конкурентоспособность и профессиональную адаптивность.

Программа рекомендуется к реализации и улучшению в соответствии с изложенными предложениями.

Директор ТОО « Д-Строй-Снаб.KZ» _____ ***Баукенов Д.Е***