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Higher and Postgraduate Educational Programs

☐ Project EP ☒ Participant of project EP

OHPE (Developer)

non-profit joint-stock company "Abai Kazakh National Pedagogical University"

Title of project EP

Co-developers

West Kazakhstan University named after Makhambet Utemisov NPJSC

Non-commercial joint-stock company "K.Zhubanov Aktobe regional university"

NJC «KazNWTTU»

non-profit limited company "Atyrau University named after Kh. Dosmukhamedov"

Date of registration in the Registry

06.06.2024

Registration number

6B01500453

Date of EP passport updating

08.07.2026 22:02

Field of education

6B01 Pedagogical sciences

Direction of personnel training

6B015 Training of teachers in Natural science subjects

Group of educational programs

B010 Teacher training in physics

Educational program

6B01512 Physics (IP)

EP purpose

The aim of the educational program is to train physics teachers with competencies in new fields that meet modern and form competencies necessary for teachers of the 21st century who live and work in a world of variability, uncertainty and ambiguity.

EP type

Innovative EP

Level on NQF

6

Level on SQF

6

EP distinctive features

No

Language of education

Russian

Kazakh

multilingual

Professional Standard for EP

Exists



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№	Name of professional standard
1	Professional standards for teachers of educational organizations

Professional standards (career standards)

Professional standard has been used at developing EP

Professional standard №1

Professional standardПрофессиональные стандарты для педагогов

Approval year2024

CCEA.....

Professions

Profession №1

ProfessionУчителя средней школы

Уровень по ОРК6

Labor functionsОсуществление учебного процесса.
Приобщение обучающихся к систематическому изучению основ наук.
Оценивание учебных достижений обучающихся.
Осуществление классного руководства.
Осуществление учебно-методической работы.

Profession №2

ProfessionПедагоги колледжей и других образовательных учреждений

Уровень по ОРК6

Labor functionsПроведение мониторинга образовательных достижений обучающихся.
Осуществление деятельности руководителя учебной группы.
Осуществление научно-методической деятельности.
Осуществление учебного процесса с учетом индивидуальных способностей и потребностей обучающихся.

Volume of the credits240

Degree to be conferredBachelor

Period of study4

Date of approval EP on the Academic Council27.04.2026

Date when EP was approved by the Republican Educational and Methodological Board of the Ministry of Science and Higher Education of the Republic of Kazakhstan18.05.2023

Existence of the annex to the license for the direction of personnel training



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☐The training format is online

☒EP accreditation existence

Atlas of new professions

не предусмотрено

Regional standard

не предусмотрено

The formed educational outcomes

№	Educational outcome	Code	Reflects the labor function
1	Possess intercultural	ON1	Приобщение обучающихся к системе ценностей. Осуществление классного руковод
2	To collect and	ON2	Осуществление научно-методической деятельности. Приобщение обучающихся к с Осуществление учебного процесса с учетом индивидуальных способностей и потреби Проведение мониторинга образовательных достижений обучающихся.
3	Critically select	ON3	Осуществление учебного процесса. Осуществление учебного процесса с учетом индивидуальных способностей и потреби Осуществление учебно-методической деятельности. Оценивание учебных достиже
4	Understand the	ON4	Осуществление учебного процесса с учетом индивидуальных способностей и потреби Осуществление учебного процесса. Осуществление классного руководства. Оценивание учебных достижений обучающихся.
5	To recognize	ON5	Осуществление научно-методической деятельности. Осуществление деятельности руководителя учебной группы.
6	To cover holistically	ON6	Осуществление учебно-методической деятельности. Проведение мониторинга образовательных достижений обучающихся. Приобщение обучающихся к системе ценностей.
7	Demonstrate strong	ON7	Осуществление учебного процесса. Осуществление научно-методической деятельн Оценивание учебных достижений обучающихся.
8	To conduct scientific	ON8	Осуществление научно-методической деятельности. Осуществление учебного проц Оценивание учебных достижений обучающихся.
9	Apply modern	ON9	Осуществление научно-методической деятельности. Осуществление деятельности руководителя учебной группы. Осуществление учебно-методической деятельности. Осуществление учебного проц Оценивание учебных достижений обучающихся.
10	Conduct integrated	ON1	Осуществление учебного процесса. Осуществление учебно-методической деятельн Осуществление учебного процесса с учетом индивидуальных способностей и потреби Оценивание учебных достижений обучающихся.
11	Work in interdisciplinary	ON1	Осуществление деятельности руководителя учебной группы. Оценивание учебных достижений обучающихся. Осуществление научно-методичес
12	Understand the	ON1	Оценивание учебных достижений обучающихся. Осуществление научно-методичес Осуществление деятельности руководителя учебной группы. Проведение мониторинга образовательных достижений обучающихся. Осуществление учебного процесса.



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Nº	Name of discipline	Short description of discipline	Cycle
1	Basics of Research Methods	The goal is to form knowledge about the principles, technologies, practical methods and techniques of conducting scientific research based on modern achievements of scientists. Forms the basic foundations of scientific culture and ethics, flexible perception of scientific texts, skills of effective application of acquired knowledge in planning and organizing research work, the ability to analyze and summarize research results.	GED
2	Ilyastanu	The purpose of the discipline is to develop a deep-thinking personality with high aesthetic taste, appreciating literature, art, traditions, culture and language of the Kazakh people through a deep and comprehensive study of the works of Ilyas Zhansugurov. Forms an understanding of the importance of the works of Ilyas Zhansugurov in the development of the Kazakh literary language; skills of intellectual and creative thinking, the ability to cherish the values of national and spiritual heritage.	GED
3	Fundamentals of Financial Literacy	The course is aimed at gaining knowledge and skills in the field of personal finance management. Also, as part of the course, students will learn how to use in practice all kinds of tools in the field of finance, save and increase savings, plan a budget competently, learn how to analyze financial information and navigate financial products to choose an adequate investment strategy.	GED
4	Basics of Law and Anti-Corruption Culture	The aim is to familiarize students with the main branches and institutions of law, the basics of an anti-corruption culture, as well as the laws of the emergence, development and functioning of the state and law. The course forms the skills of an anti-corruption culture and a high level of theoretical knowledge about the main functions of law in the state and society, its impact on the development of law-based state, civil society.	GED
5	Ecology and Life Safety Basics	Purpose – to form knowledge on the basics of ecology and life safety, allowing to analyze environmental processes, assess the socio-ecological consequences of anthropogenic activities, methods and technologies of protection in emergency situations. Develops skills to assess the impact of environmental factors on human health; predict environmental processes for planning and implementing measures to improve life safety; make decisions in adverse environmental and emergency situations, taking into account the possible consequences of accidents, catastrophes, natural disasters.	GED
6	Economics and Entrepreneurship	The purpose is to familiarize students with the economic problems of modern society, the formation of economic thinking and gaining knowledge in the field of theoretical foundations and practical skills in the field of entrepreneurship. The purpose is to familiarize students with the economic problems of modern society, the formation of economic thinking and gaining knowledge in the field of theoretical foundations and practical skills in the field of entrepreneurship. It is focused on the formation of students' comprehensive understanding of the laws of the functioning of the economy, obtaining business education aimed at acquiring applied competencies in various fields of entrepreneurial activity, reveals the features of creating and successfully running their own business.	GED
7	Physics of the Atom and Atomic Nucleus	The discipline is aimed at studying the basic provisions, laws, logical content and mathematical expressions of atomic physics, nuclear physics. The main properties of the atomic nucleus, the main types of radioactivity, the laws of simple and complex radioactive decay, General laws of nuclear interactions, the elementary theory of fission and synthesis of atomic nuclei, modern achievements in the field of physics of the atom and the atomic nucleus are considered.	BD
8	Assessment and Development	Objective: understanding the value of assessment in the learning process and the ability to provide constructive assessment in an ethical manner at various stages of the learning process and critically evaluate and analyze their understanding and practice regarding assessment. Students can: be well versed in a variety of assessment and feedback methods (for example, formative and final assessment); apply pedagogical principles to determine and recognize the levels of educational competence of students.	BD

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	  ЕДИНАЯ ПЛАТФОРМА ВЫСШЕГО ОБРАЗОВАНИЯ	English 	
9	Age and Physiological Features of the Development of Children	age-appropriate learning processes, taking into account the individual needs of students, creatively support universal learning and the well-being of students. Students can: recognize individual starting points of different students, their learning potential and needs for specific support; consider the individual needs of their students for specific support, guidance, training and evaluation.	BD
10	Educational Science and Key Theories of Learning	The purpose of this course is to improve pedagogical competence in the field of pedagogy and didactics Future teachers study the basics of pedagogical science, such as conceptual ideas about a person, leading to various theories of learning and pedagogical models. Based on the understanding of theoretical concepts, future teachers can make appropriate pedagogical choices for various educational situations.	BD
11	Psychology in Education and Concepts of Interaction and Communication	The purpose of this course is the formation of competence in the field of pedagogy and didactics; the area of competence for interaction. Pre-service teachers are familiar with the modern psychological theories and models, as well as personality functioning and individual properties. They can apply the knowledge in their teaching in diverse educational contexts. Pre-service teachers support positive development of learners by fostering dialogue, interaction, and communication in the educational process. They are able to communicate, interact, and collaborate with pupils’ families as well as in various other partnership networks and create new relationships suitable for the development of their own pedagogical activity. Pre-service teachers who demonstrate competence can: understand the basic concepts and terms of educational psychology, and the main practical applications of psychological knowledge; understand the patterns, facts, and phenomena of cognitive and personal development of a person in the processes of education and upbringing; apply an integrated approach to design, implementation, evaluation, and development of educational environments; understand the concept of continuous learning as a part of the process of cognitive and personal development of a person; apply basic communication and interaction concepts and theories at the individual, community, and network levels; select the methods of communication and interaction that are most appropriate to facilitate learning in various forms (offline, online, blended, hybrid); recognize the patterns of group dynamics and act in ways that promote community development and well-being.	BD
12	Fundamentals of Artificial Intelligence	The discipline is aimed at studying the basic concepts, methods and algorithms that underlie the creation and application of artificial intelligence. As part of this course, students will learn the theoretical foundations of machine learning, neural networks, natural language processing algorithms, and computer vision. They will also get acquainted with the ethical, social and legal aspects of the application of artificial intelligence in various areas of life.	BD
13	Research, Development and Innovation	Objective: formation of research- and development-oriented thinking, the ability to develop, uMDate and apply innovative approaches and learning technologies in the context of ongoing changes in society and the educational environment. Students can: develop their own teaching skills through research-based approaches; apply critical thinking when collecting and using data for software development; participate in scientific research and/or develop cooperation between universities and stakeholders; document your own research activities and present the results using various forms of communication.	BD
14	Inclusive Educational Environment	Goal: understanding and the ability to take into account the diversity of students in the learning/teaching process, in a reasonable way, psychologically and ethically maintain well-being, taking into account the context of their lives. Students can: embrace diversity, identify barriers to participation and learning; identify development priorities, plan activities for the adaptation of educational programs, the development of differentiated lessons.	BD

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15	Mathematical Analysis	the knowledge and ability of future specialists to apply mathematical apparatus and mathematical methods in the analysis of physical phenomena and processes. Limit of the numerical sequence. Limit, continuity, uniform continuity of the function. Fundamentals of differential calculus. Basic integration methods. A definite integral and its physical applications. Improper integral. Functions of many variables. Multiple integrals. has skills in using mathematical methods to solve physical problems.	BD
16	Mechanics	During the course, future teachers develop their competencies related to the use of modern theoretical concepts in mechanics. They also develop their skills based on the acquired theoretical knowledge, which allows them to creatively create and apply physical models to solve problems of studying the properties of mechanical objects. Future teachers develop their skills of independent work, including the study of algorithms, tools and tools necessary to solve problems of mechanics.	BD
17	Molecular Physics and Thermodynamics	During the course, future teachers acquire modern knowledge and practical skills of research work in the field of molecular physics and thermodynamics. They master the methods of scientific research in the field of molecular physics and thermodynamics. After mastering this course, they competently and critically select a theoretical model for the observed phenomena.	BD
18	Teaching Methods and Technologies	Purpose: to increase competencies in the field of pedagogy and didactics. Students have a holistic understanding of the methodological system of education, can model strategies and technologies for solving specific pedagogical problems, planning, guidance, teaching and evaluation, are able to use knowledge, forms, methods and technologies of teaching in accordance with the conditions of a particular school and the capabilities of students. Students can: choose pedagogical models suitable for their training; apply teaching methods creatively and in a variety of ways, taking into account the opportunities offered by technology; use a suitable learning environment in your teaching; know and apply the rules and principles of copyright and data protection.	BD
19	Teaching Planning and Individualization of Learning	Purpose: formation of skills of individualization of teaching, taking into account the diversity of students and the use of teaching technologies, based on pedagogical and independent research. Students can: understand the requirements of competence, entrepreneurship and sustainable development in their pedagogical and subject area when planning and conducting training; plan and predict other conditions that affect learning; apply the principles of individual learning and guidance in practice, take into account the needs of their students, support the development of their personality and self-esteem.	BD
20	Optics	During the course, future teachers get acquainted with physical phenomena related to the laws of light propagation and its interaction with matter. They form their understanding of the basic concepts and laws of optics, as well as methods of optical research. They also master the skills of simple practical calculations. Future teachers also develop their skills in independent and experimental work related to solving problems in optics.	BD
21	Pedagogical Research	Future teachers will be trained in the skills of searching and critical selection of theoretical knowledge from various reliable sources, the use of research results in the development of their pedagogical thinking and practice. They are willing to promote research-based learning and education, as well as their own continuous development and professional growth.	BD
22	Linear Algebra and Analytic Geometry	The purpose of the discipline is to form ideas about the theory of determinants, matrix analysis, and methods for solving systems of linear equations. Elements of set theory. Linear equation system. Determinants. Complex number. Scalar, vector, and mixed product of vectors and their applications. Method of coordinates on the plane. Second-order curves on the plane. Equations of a surface and a line in space. Second-order surfaces and their canonical equations. Mastering the mathematical apparatus of linear algebra for further use in the process of future scientific work.	BD



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23	Electricity and Magnetism	and electromagnetic phenomena. They develop a modern scientific view of the nature of electric and magnetic fields, the electromagnetic field and the basic laws of electromagnetism. They also develop their independent work skills, including the study of algorithms, tools and devices necessary to solve problems of electricity and magnetism.	BD
24	Pedagogical Design in the Informational Educational Environment	The course focuses on studying the didactic goals and the effectiveness of using tools within the informational educational environment. Students learn methods of integrating digital technologies into the learning process and develop skills in creating resources that contribute to achieving educational outcomes.	BD
25	Programming	During the course, pre-service teachers develop their understanding of the fundamental Python programming concepts. They also develop their algorithmic thinking skills as well as coding skills by using commonly used data structures, writing custom functions, and reading and writing results to files.	BD
26	Digital Technologies in Education	Informatization of education. Modern digital technologies and their use in education. Multimedia technologies. 3D-technologies in education. Classification of digital educational resources. Development of high-quality digital educational resources. Virtual reality. Digital robotics. Methods the use of digital educational resources in the learning process. Problems of digitalization of extracurricular and research activities.	BD
27	Computer Graphics	Acquaintance of students with modern principles of construction of graphic systems of two-dimensional and three-dimensional image transformation. Learn graphics algorithms. Master the methods of creating realistic three-dimensional images.	BD
28	School Physics Experiment	The course covers the basic physical phenomena and laws, through practical experiments. It includes sections of the general physics course: mechanics, molecular physics and thermodynamics, electricity, optics. Students conduct experiments, measure and analyze data, and understand physical principles. Develops the skills of observation, measurement, logical thinking.	BD
29	Technique of the School Experiment	The course introduces students to the methods of planning, conducting and analyzing physical experiments. Covers the selection of equipment, measuring instruments, safety. Students master the skills of setting up experimental installations, data processing. Raises questions of accuracy, errors, interpretation of results. Develops the ability to systematize experimental research.	BD
30	Laboratory Workshop on Physics 1	The course is aimed at developing experimental skills in the study of the fundamental laws of mechanics, molecular physics, and thermodynamics. During laboratory work, students learn methods for conducting physical measurements, processing and analyzing experimental data, assessing errors, as well as interpreting experimental results and drawing scientifically grounded conclusions.	BD
31	Laboratory Workshop on Physics 2	The course is aimed at studying the fundamental phenomena and laws of electricity and magnetism through laboratory work. Students learn methods of experimental measurement, analyze electrical and magnetic processes, and develop skills in processing and interpreting experimental data.	BD
32	Laboratory Workshop on Physics 3	The course is devoted to the experimental study of the fundamental phenomena of optics, atomic physics, and nuclear physics. During laboratory work, students investigate interference, diffraction, and emission spectra, as well as become familiar with methods for recording and analyzing atomic and nuclear processes, developing skills in experimental work and data processing.	BD
33	Theory and Methodology of Solving Physics Problems	The course is devoted to studying the theoretical foundations and methodological approaches for solving physics problems of varying levels of complexity. It covers strategies for analyzing problems, constructing physical models, applying the laws and principles of physics, as well as methods for presenting and verifying solutions. Special attention is given to developing logical thinking and independent problem-solving skills.	BD

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34	Astronomy	celestial sphere and coordinate systems, the structure of the Solar System and the phenomena occurring in it, the structure of our Galaxy, the structure of the Universe - initial information about astrophysics and methods of astronomical research. Future teachers also get acquainted with the history of the development of ideas about the Universe. They build their modern scientific understanding of the structure of the universe and the history of the development of astronomy.	PD
35	Classical Mechanics	The study of the discipline are considered Newtonian, Lagrangian, Hamiltonian formulation of equations of motion of the system, variational principles, conservation laws, particle motion in the fields, the problem of two bodies, the dynamics of solids and particle dynamics in non-inertial reference systems, equations of mechanics of continuous media.	PD
36	Methods of Mathematical Physics	During the course, future teachers study the basics of field theory and the necessary mathematical methods. They master the basic types of partial differential equations used in physical problems, including nonlinear equations, and some types of special functions of mathematical physics and their properties, the basics of the finite difference method. This course develops the skills of future teachers to build mathematical models of physical phenomena and analytical and numerical problem solving.	PD
37	Statistical Physics and Basics of Physical Kinetics	The discipline is aimed at the formation of deep and solid knowledge and understanding of the fundamental thermodynamic and statistical laws of physics of macroscopic systems; the use of knowledge for the formulation and solution of problems of modern physics. Contents: statistical system as an object of research. Microcanonic distribution in quantum statistics. Thermodynamics of closed systems. Classical statistical mechanics. Maxwell-Boltzmann statistics of ideal gases. Fermi-Dirac and Bose-Einstein distribution.	PD
38	Workshop on Solving Physical Problems 1	The course is aimed at developing practical skills in solving physics problems in mechanics, molecular physics, and thermodynamics. During the classes, students apply fundamental laws and models to analyze physical processes, master calculation methods, interpret results, and develop logical and analytical thinking.	PD
39	Workshop on Solving Physical Problems 2	The course is aimed at developing practical skills in solving physics problems in electricity and magnetism, optics, as well as atomic and nuclear physics. Students apply fundamental laws of physics to analyze various processes, improve calculation techniques, learn to justify their solutions, and correctly interpret the obtained results.	PD
40	Methods of Teaching Physics: Specific Issues	During the course, future teachers learn to combine knowledge about the content of physics in the secondary school curriculum and knowledge about the forms, methods and technologies of teaching to develop physics lessons, teaching methods and evaluation, to conduct scientific and methodological analysis of topics and sections of the school physics course.	PD
41	Project and Research Activities in Physics Education	The course is focused on mastering the methods of project-based and research work in physics. Students develop and implement their own scientific research and educational projects, formulate hypotheses, conduct experiments, analyze results, and draw conclusions, thereby fostering creative thinking, independence, and scientific competence.	PD
42	Solution of Olympiad Tasks on Physics	Discipline is aimed at solving Olympiad problems in General physics, focused on maintaining a high level of interest in physics. The content of the proposed problems covers all sections of the course of General physics, while the problems are often synthetic, combining programs of different sections of physics, which brings up students ' understanding of a single physical picture of the physical phenomena considered in the problems.	PD
43	Electrodynamics	Electrodynamics studies the interaction of electric and magnetic fields with charged particles. The main concepts include electromagnetic fields, Maxwell's laws, electromagnetic waves and their propagation. The discipline covers both static and dynamic situations, describing how electric and magnetic fields affect each other and matter.	PD

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44	Educational Robotics and Mechatronics	necessary to include science and technology (using robotics) in teaching methods, developing interest in the use of educational robotics in the learning process. Introduce the basics of robot programming, which allows you to continue studying this topic on your own, and introduce them to the world of technology and artificial intelligence. Considerable attention is paid to familiarization with the possibilities and methodological features of the application of educational robotics and mechatronics in the project activities of students.	PD
45	AI-based Modelling and Analysis of Physical Processes	The course is aimed at studying methods for modelling and analyzing physical processes using artificial intelligence technologies. Students learn data processing techniques for physical systems, model development, the application of machine learning algorithms, and prediction of physical phenomena behavior.	PD
46	Quantum Mechanics	The basic principles and apparatus of quantum mechanics are considered, macroscopic manifestations of quantum laws of conductivity of solids and their application in electronic and measuring technology are considered. Students should get a clear idea of the physical nature of phenomena subject to quantum laws, learn to interpret quantum processes from a materialistic position.	PD
47	Fundamentals of Applied Behavior Analysis	Course goal – to develop the ability, grounded in Applied Behavior Analysis (ABA), to critically analyze data-based functions of behavior; design and implement individualized interventions in inclusive educational settings; and evaluate their effectiveness, safety, and ethical soundness. Develops skills to: operationalize behavior; collect and analyze data (incl. ABC); identify behavioral functions; design and apply behavior support plans; teach functionally equivalent alternative behavior; manage crisis situations; and assess outcome	PD
48	Quantum Field Theory	The main purpose of teaching this discipline is to familiarize with the basic concepts, phenomena, modern problems of quantum field theory, the transition from the General course of non-relativistic quantum mechanics, based on the solution of the schrödinger equation, to relativistic equations of quantum mechanics, which are based on the Klein-Gordon-Fock equation for spinless particles and Dirac equation for spin 1/2.	PD
49	Innovative Technologies in Teaching Physics	Digital technologies in education and smart-education issues are studied. The aspect is made for flexible learning in an interactive educational environment based on the use of mobile devices with content from around the world, which is freely available, allowing to expand the boundaries of learning, not only in terms of the number of students, but also in terms of time and spatial indicators.	PD
50	Physics in STEM	A complete introduction to Physics for students in the STEM field. It covers major topics including mechanics, thermodynamics, electricity and magnetism, optics and quantum physics.	PD