Ф.7.02-09

Ministry of Sciences and Higher Education of the Republic of Kazakhstan

M. Auezov South Kazakhstan University

«APPROVED»

Chairman of the board - Rector

Doctor of historical sciences,

Academician Kozhamzharova D.

«____» _____ 202_3_ y.

EDUCATION PROGRAMME

7M01520-Physics

Registrationnumber	7M01500016
Code and classification of the field of education	7M01 Pedagogical Science
Code and classification of training areas	7M015 Teacher training in natural science subjects
Group of educational programs	M011 Teacher training in physics
Typeof EP	Acting
ISCE level	7
NQF level	7
SQF of education level	7
Language of learning	Kazakh, Russian
The complexity of the EP,	120 credits
Distinctive features of EP	-
University Partner (JEP)	-
University Partner (TDEP)	-

Shymkent, 2023.

Drafters:

Name	Position	Sign
Tursynbaev A.Z.	Candidate of Pedagogical Sciences head of the Department" Physics " Associate Professor	
Saidakhmetov P.A.	Candidate of Physical and Mathematical Sciences, Associate Professor of the Department of Physics	
Abdualieva M.A.	PhD., Associate professor of the Department of physics	
Abdraimov R.T.	master, senior teacher	
Baubekova G.M.	master, senior teacher	
AkimkulAltynai	master student of group MEP-21 2nk	
Ualikhanova B.S.	SKSPU. Head of the Department" physics " PhD	
SarsenbaevaZh.P.	Director of the school-gymnasium №50 named after A. Baitursynov	
Myrzasalieva A. S.	Director South Kazakhstan Humanitarian and Economic College	

The EP was considered in the direction of training Natural sciences at a meeting of the Academic Committee,

Minutes № 06 « 02 » _____ 2023 y.

Chairman of the Committee _____ Urazbaev K.M.

The EP was considered and recommended for approval at Educational-methodical meeting of M. Auezov SKU,

Minutes № 4* « 22 » 02 2023 y.

Chairman of the EMC _____ Abisheva R.

The EP was approved by the decision of the Academic Council of the University,

Minutes № 13 « 23 » 02 2023 y.

CONTENT

CONCEPT OF THE PROGRAM

Mission of the University	We are focused on generating new competencies, training a leader who translates research thinking and culture.
University Values	– Openness - open to change, innovation and cooperation. – Creativity - generates ideas, develops them and turns them into values – Academic freedom - free to choose, develop and act. – Partnership - creates trust and support in a relationship where everyone wins. – Social responsibility - ready to fulfill obligations, make decisions and be responsible for their results.
Graduate Model	– Deep subject knowledge, their application and continuous expansion in professional activity – Information and digital literacy and mobility – Research skills, creativity and emotional intelligence – Entrepreneurship, independence and responsibility for their activities and well-being – Global and national citizenship, tolerance to cultures and languages
Uniqueness of the EP	Orientation to the regional labor market and social order through the formation of professional competencies of the graduate, adjusted to the requirements of stakeholders • Practical orientation and emphasis on the development of critical thinking and entrepreneurship, the formation of a wide range of skills that will allow to be functionally literate and competitive in any life situation and be in demand in the labor market
Academic Integrity and Ethics Policy	The University has taken measures to maintain academic integrity and academic freedom, protection from any kind of intolerance and discrimination: • Rules of academic integrity (Order No. 212-нқ dated 10.10.2022); • Anti-Corruption Standard (Order No. 221-нқ dated 07.12.2021). • Code of Ethics (order No. 212-нқ dated 10.10.2022). • Anti-Corruption Policy of the NJSC “M. Auezov South Kazakhstan University.” (order No. 144 пқ dated 07.14.2022).
Regulatory and legal framework for the development of EP	1. Law of the Republic of Kazakhstan "On Education" No. 319-III dated July 27, 2007; 2. Standard rules of activity of educational organizations implementing educational programs of higher and (or) postgraduate education, approved by Order of the Ministry of Education and Science of the Republic of Kazakhstan dated October 30, 2018 No. 595 3. State obligatory standards of higher and postgraduate education, approved by order of the Ministry of Education and Science of the Republic of Kazakhstan dated July 20.2022 No. 2; 4. Rules for the organization of the educational process on credit technology of training, approved by the Order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152; 5. Qualification directory of positions of managers, specialists and other

	employees, approved by the Order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan on December 30, 2020 No. 553. 6. Guidelines for the use of ECTS. 7. Guidelines for the development of educational programs of higher and postgraduate education, Appendix 1 to the order of the Director of the Central Research Institute No. 45 o/d dated June 30, 2021.
Organization of the educational process	– Implementation of the principles of the Bologna Process – Student-centered learning – Availability – Inclusivity
Quality assurance of EP	– Internal quality assurance system – Involvement of stakeholders in the development of the EP and its evaluation – Systematic monitoring – Updating the content (updating)
Requirements for applicants	They are established according to the Standard Rules of admission to training in educational organizations implementing educational programs of higher and postgraduate education Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 600 dated 31.10.2018
Conditions for the implementation of educational programs (EP) for persons with disabilities and special educational needs(SSN)	For students with SEN (special educational needs) and persons with disabilities (PSI), tactile PVC tiles, specially equipped toilets, a mnemonic diagram, and shower bars have been installed in educational buildings and student dormitories. Special parking spaces have been created. Crawler lift installed. There are desks for people with limited mobility (PLM), signs indicating the direction of movement, ramps. In the educational buildings (main building, building No. 8) there are 2 rooms with six working places adapted for users with disorders of the musculoskeletal system (DMS).For visually impaired users, the SARA™ CE Machine (2 pcs.) is available for scanning and reading books. The library website is adapted for the visually impaired. There is a special NVDA audio program with a service. The JIC website http://lib.ukgu.kz/ is open 24/7. An individual differentiated approach is provided for all types of classes and in the organization of the educational process.

2. EP PASPORT

Purpose of the OP	• Training of highly qualified masters with conceptual knowledge in the field of scientific and pedagogical physics and capable of self-development and implementation in research and teaching activities.
OP Tasks	– meeting the needs of the individual in intellectual, cultural and moral development by obtaining higher postgraduate education; - training of masters, teachers of physics, capable of successfully mastering related areas of professional activity, as well as advanced training, training in additional education programs and continuing education in doctoral studies; – meeting the needs of society in qualified specialists in the field of education and teaching physics in universities that are able to integrate academic values with entrepreneurial ideas; - development of a favorable educational environment for the implementation of professional, cultural and linguistic needs of students ; – formation of a deep professional understanding of fundamental problems and practical methods for their solution in the field of physics and methods of teaching physics and its applications in scientific and pedagogical activities; - the formation of professional ability to plan and independently conduct effective scientific and pedagogical work, as well as to critically evaluate its results; - the formation of the ability to adapt and apply general methods of solution to the solution of non-standard problems; - preparation for professional activities at a university, research institute, in production or doctoral studies.
Harmonization of EP	• **7** th level of the National Qualifications Framework of the Republic of Kazakhstan; • Dublin descriptors of the 7th level of qualification; • 2 cycle of a Framework for Qualification of the European Higher Education Area); • • 7th Level of European Qualification Framework for Life long Learning).
Connection of EP with the professional sphere	Professional standard "Teacher", approved by the order of the Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" No. 133 dated June 8 , 2017 .
Name of the degree awarded	After the successful completion of this EP, the graduate is awarded the degree of Master Pedagogical Sciences " 7M01520-Physics "
Sphere of professional activity	. Masters of EP7M01520-Physics can hold the positions of assistant teacher, teacher, senior teacher of physics in universities, colleges, teacher-researcher and teacher-master in secondary and secondary specialized educational institutions, and researcher in research institutions.
Objects of professional activity	• area of education; • social sphere for the development of children and students; in general educational and higher educational organizations; educational institutions and centers; • scientific activity and entrepreneurship in the field of education; • the field of physics, physics in education and at work.– area of education higher, secondary and secondary specialized educational institutions (universities, colleges, technical and vocational education institutions,

	lyceums, school gymnasiums), • management organizations: state education authorities, departments of education; • research organizations.
Subjects of professional activity	• the educational process in the unity of its value-target guidelines, content, methods, forms and results; • scientific and pedagogical, innovative, informational and analytical activities in the field of physics and methods of teaching physics.
Types of professional activity	• *pedagogical and educational:* - organization of the educational process at different levels of the education system (organization of the process of education and upbringing, design and management of the pedagogical process, diagnostics, correction, prediction of the results of pedagogical activity); – preparation and conduct of classes in physics; - management of scientific work of students; - conducting optional classes in physics; - organization of cultural and leisure work with young students in the field of education, development of programs, methods and technologies for educational work in the field of physics and its scientific and technical achievements. • *research:* – conducting scientific research on the problems posed in the field of education; – selection of the necessary research methods; – formulation of new tasks arising in the course of scientific research; – work with scientific literature using new information technologies, tracking scientific periodicals; – analysis of the received scientific information using modern computer technology. • *scientific and innovative:* application of the results of scientific research in innovation; - development of new methods of scientific and pedagogical activity; participation in the formulation of new tasks and the development of new methodological approaches in scientific and innovative research; - processing and analysis of the received data with the help of modern information technologies. • *organizational and managerial:* - participation in the organization of research and scientific and innovative works; - participation in the organization of seminars, conferences; - preparation of abstracts, writing and registration of scientific articles; - participation in the preparation of applications for grant competitions and registration of scientific and pedagogical projects, reports and patents.
Educational Outcomes	**EO1** To conduct comprehensive research in the field of education and methods of teaching physics based on a holistic systematic scientific worldview using knowledge of the history and philosophy of science, as well as management in scientific and pedagogical research. **EO2** Apply theoretical, methodological and technological achievements of world science, foreign teaching technologies, as well as draw up scientific and pedagogical documentation, scientific reports, reviews, reports in English. **EO3** Conduct a psychological analysis of the relationship between

	organizational problems, management principles and quality in the field of their professional activities. **EO4** To organize the educational process in educational institutions of higher education, research work of students in the field of education and methods of teaching physics, taking into account the peculiarities of inclusive education. **EO5** To generalize and apply the results of modern research in the field of methods of teaching physics and achievements of physics, its methodology and research methods, assessment systems for teaching physics disciplines in educational institutions. **EO6** Conduct teaching and research activities at a professional level, demonstrating knowledge of the laws and principles of physics, using innovative and digital technologies, interactive teaching methods and interdisciplinary communication. **EO7** Apply modern achievements of physics, astrophysics and education in teaching, describing physical processes observed in nature and in space objects, using methods of the theory of differential equations **EO8** To apply the laws and principles of physics, numerical models of physical processes, physical foundations of high technologies in teaching, solving applied problems of physics and astrophysics, using modern methods of scientific research and processing and interpretation of experimental data. **EO9** Conduct physics training by managing the audience, promoting collaboration in a team, using coaching technology, machine learning methods and modeling of cyber-physical systems, encouraging creativity, leadership, critical thinking and teamwork of students. **EO10** Apply distance learning technologies, machine learning methods and modeling of cyber-physical systems in teaching physics, taking into account the achievements of physics science, modern educational practice and advanced pedagogical experience. **EO11** To design and implement forms and methods of quality control of education, as well as various types of control and measuring materials, based on the use of criteria-based assessment and advanced foreign teaching technologies using digital technologies.

3.COMPETENCES OF THE GRADUATE OF EP

SOFT SKILLS (Behavioral skills and personality qualities)	
SS 1. Competence in managing one's own literacy	SS1.1. Strive for professional and personal growth throughout life. SS 1.2. Constantly update own knowledge within the chosen trajectory and in an interdisciplinary environment, carry out further learning with a high degree of independence and self-regulation. SS 1.3. To be capable of reflection, an objective assessment of one's achievements, an awareness of the need to form new competencies and continue education in doctoral studies.
SS 2. Language competence	SS2.1. The ability of possessing a sufficient level of communication in the professional field in the state, Russian and foreign languages for negotiating and business correspondence. SS 2.2. The ability of mastering the skills of mediation and intercultural understanding.
SS 3. Mathematical Competence and Competence in the field of Science	SS3.1. The ability to interpret the methods of mathematical analysis and modeling for solving applied problems in the field of study. SS3.2. The ability to plan the setting of scientific experiments, integrate and implement the results of scientific research in the professional field. SS 3.3. The ability to analyze and comprehend modern methods of pedagogical and psychological science and apply them in pedagogical activity.
SS 4. Digital competence, technological literacy	SS 4.1. The ability to confidently use modern information and digital technologies, artificial intelligence systems for work, leisure and communications. SS 4.2. Proficiency in the use, recovery, evaluation, storage, production, presentation and exchange of information in a wide range of digital devices. SS 4.3. Ability to confidently use global information resources and apply technological literacy in research and computational and analytical activities.
SS 5. Personal, social and academic competencies	SS 5.1. Possession of the norms of business ethics, social and ethical values and focus on them in professional activities. SS 5.2. Formation of a personality capable of mobility in the modern world, critical thinking and physical self-improvement. SS 5.3. Ability to work in a team, correctly, clearly and reasonably defend one's position during discussions and make decisions of a professional nature. SS 5.4. Ability to adequately navigate in various social spheres of activity and in conditions of uncertainty. SS 5.5. Ability to find compromises, correlate own opinion with the opinion of the team.
SS 6. Entrepreneurial competence	SS 6.1. The manifestation of leadership qualities and the ability to have a positive impact on others, to lead a team. SS 6.2. The ability to create conditions for the development of creative and entrepreneurial skills of the team. SS 6.3. The ability to work in a mode of uncertainty and rapidly changing task conditions, make decisions, respond to changing working conditions, allocate resources and manage your time. SS 6.4. Ability to work with consumer needs.

SS 7. Cultural awareness and ability to express yourself	SS7.1. The ability to show worldview, civil and moral positions. SS7.2. The ability to be tolerant of the traditions and culture of the peoples of the world, to have high spiritual qualities.
HARDSKILLS	
Theoretical knowledge, practical skills and abilities specific to this area	PC1 ability to independently set specific tasks of scientific research in the field of methods of teaching physics and solve them with the help of information technology and the use of the latest domestic and foreign experience.
	PC2 the ability to apply knowledge of physics and methods of teaching physics to solve scientific and innovative problems, and apply the results of scientific research in innovative scientific and pedagogical activities.
	PC3 ability to participate in the development of new methods and methodological approaches in scientific and innovative research and teaching activities
	PC4 the ability to plan, organize and conduct research, scientific seminars and conferences in the field of education and physics.
	PC5 ability to prepare and execute scientific and pedagogical documentation, scientific reports, reviews, reports and articles.
	PC6 ability to lead research activities of students in the field of physics and methods of teaching physics.
	PC7 the ability to methodically competently build lesson plans for the sections of academic disciplines in physics and publicly present the theoretical and practical sections of these disciplines in accordance with the approved teaching AIDS.

3.1 Matrix mapping of learning outcomes at the EP in General, generated by the competence modules

	EO1	EO2	EO3	EO4	EO5	EO6	EO7	EO8	EO9	EO10	EO11
SS1	+	+	+			+	+				
SS2	+	+	+			+	+		+	+	
SS3		+	+	+	+		+	+	+		+
SS4	+	+		+	+						+
SS5		+			+				+		+
SS6			+	+	+			+	+	+	
SS7					+		+			+	
PC1	+	+	+		+		+	+			
PC2	+	+	+		+	+	+	+			
PC3		+		+		+					
PC4			+		+	+		+			
PC5			+				+			+	
PC6							+		+		
PC7			+		+	+		+		+	+

5. MATRIX A OF THE INFLUENCE OF DISCIPLINE ON THE FORMATION OF EDUCATIONAL OUTCOMES AND INFORMATION ON LABOR INTENSITY

№	Modulename	Cycle	Component	Name of the discipline	Brief description of the discipline	Amount of credits	Formed educational outcomes (codes)										
							EO1	EO2	EO3	EO4	EO5	EO6	EO7	EO8	EO9	EO10	EO11
1	Module of scientific and pedagogical training	BD	HsC	History and philosophy of science	**Purpose:** to form an objective view of the history and philosophy of science based on a deep understanding and scientific analysis of the main stages, patterns of modern methods of scientific cognition. **Contents:** The main laws of the development and functioning of science, philosophical and methodological foundations of modern methods of scientific cognition. Methodological apparatus of modern history and philosophy of science. Formation of a scientific and methodological worldview based on knowledge of the features of modern science. Actual problems of the history and philosophy of science, the ability to actively use the acquired knowledge of history and methodology in scientific research.		+				+						
2		BD	HsC	Foreign language (professional)	**Purpose:** formation of intercultural and communicative competence of undergraduates in the process of foreign language education at a sufficient level. presentation of scientific information in various fields of communication, methods of annotation, abstracting and translation of literature in the specialty. **Contents:** General scientific, special terminology, grammatical material sufficient for the implementation of oral and written communication in business and professional communication, methods of oral, written and electronic communication in English. Stylistic			+			+						

					features of oral and written scientific discourse, rational methods of working with texts. Rules for the presentation of scientific information in various fields of communication												
3		BD	HsC	Psychology of management	**Purpose:** formation of knowledge of modern trends, current problems and methods of psychology development, skills of system analysis of psychological phenomena. explanation of modern trends in scientific management **Contents:** Psychological theories and management methods, modern trends in scientific management. Methodological analysis of the problem of personality psychology, psychological characteristics of personality, management methods taking into account psychological patterns. Management processes, psychological knowledge and skills in the context of their application in the practice of self-knowledge, communication, professional and personal growth.				+		+				+		
4	Methodological foundations of teaching	BD	HsC	Higher school pedagogy	**Purpose:** formation of readiness for systematic design and construction of scientific and pedagogical activity. **Contents:** Patterns of development of the higher education system; the essence, content, pedagogical patterns of the educational process of higher education. Modern approaches to the design of scientific and pedagogical activity. The main forms, technologies, methods and means of organizing the processes of education and upbringing, methods of pedagogical communication with participants in the educational process. Examples of the use of digital technologies in the implementation of the educational process.					+	+	+				+	
5		PD	HsC	Teaching Methods of special	Purpose: to form the knowledge and skills necessary for the implementation of					+	+				+	

				disciplines	professional pedagogical activity. Content: the principles and methods of developing scientific and methodological support for the disciplines of the educational program are considered. Methods of diagnostics and quality control of education at the university. Planning, organizing and conducting training sessions taking into account the specifics of teaching physics disciplines. The use of scientifically based methods and means of teaching physics. Scientific and methodological analysis of sections of physics disciplines and methods of their teaching. The ways of implementing modern technologies in teaching, their selection and design depending on the age capabilities of students and the content of the material being studied are analyzed.												
6		BD	HsC	Pedagogical practice	Purpose: formation of practical skills of teaching and learning methods. Content: studies and analyzes the organization of the educational process in higher education, the teaching experience of leading university teachers during their classes. Attends scientific and methodological consultations, plans, develops the content of training sessions and conducts them independently. Works individually with students; conducts reflection on his own pedagogical activity. Draws up a report on the results of the internship and protects it.			+				+				+	
7		BD	HsC	Research Practice	Purpose: to familiarize with the latest theoretical, methodological and technological achievements of domestic and foreign science, modern methods of scientific research, processing and interpretation of experimental data. Content: the student plans research work, gets			+		+			+	+			

					acquainted with the subject of research works and chooses a research topic. Studies special scientific domestic and foreign literature. Collects, processes, analyzes and systematizes scientific information on the topic. Selects the appropriate method of scientific research and studies the methodology of processing experimental data. He makes presentations at research seminars and conferences. Compiles a report on research work and makes a presentation of the work performed.												
8	Scientific methods of cognition of modern physics	BD	EC	History and methodology of physics	Purpose: to form an idea about the history of the origin and development of physics and its methodology. Contents: the periodization of the history of physics, the classification of the laws of its development is given. The interrelation of physics with other sciences and the main problems of physical science are discussed. The logic of the formation of basic physical representations is considered. The purpose and content of the research activity are stated. Methodological foundations of scientific research and design of educational programs; methods of theoretical and empirical research. Requirements for research methods; methodology for organizing and conducting pedagogical and physical experiments; a systematic approach to the study of physical and pedagogical phenomena and processes is analyzed.		+	+			+						
9		BD	EC	Modern Problems of Science and Education	Purpose: to form ideas about the role of science and education in the life of society, about the main directions of development of science and education. Content: the main paradigms and current problems of the development of science and education, issues of innovative development of		+	+					+			+	

					educational institutions are considered. The problems of scientific and educational activities are analyzed; methods of obtaining modern scientific knowledge. Methods of solving problems of the development of science, modern education and educational institutions. Methods of working with various sources of pedagogical knowledge; types of educational activities. The application of modern scientific achievements in educational activities, projects and criteria for evaluating their effectiveness are discussed.													
10		BD	EC	Actual Problems of Modern Physics	Purpose: formation of ideas about the fundamental concepts of modern physics; development of skills to navigate the achievements of modern physics and use them in their professional activities. Contents: the general laws of the development of physical science and the problems facing modern physical science are considered. The evolution of the basic physical views, the process of formation of the principles and concepts of physics is described. The stages of the development of physics, the logic of the development of physical science are analyzed. The current state of physics development and its interrelation with other branches of natural science disciplines and technologies are discussed.					+	+						
11		BD	EC	Modern Problems of Astrophysics	Purpose: to consider the problems of modern astrophysics; to study photometric and spectroscopic methods of astronomical observations, to develop skills to apply methods for solving astrophysical problems using basic knowledge of natural sciences. Contents: the physical processes responsible for the nature and observable features of space objects and phenomena are considered; the							+	+			

					features of the main processes occurring at the stages of the evolution of the Universe. The main postulates underlying modern cosmology are presented. Photometric and spectroscopic methods of astronomical observations on large telescopes and processing of the results of observations, as well as methods for solving problems of astrophysics are analyzed.												
12	Selected chapters of physics course	PD	EC	Selected Chapters of Atomic and Nuclear Physics	Purpose: in-depth study of the laws of atomic and nuclear physics, as well as the basics of elementary particle physics; formation of students' modern ideas about the structure and properties of the nucleus and elementary particles. Contents: the features of multielectronic atoms and molecules, the interaction of radiation and matter, the spectra of substances are considered. The effects observed when an atom is located in the field of external forces are described; the main methods of nuclear physics research are described. The regularities of nuclear reactions; the laws of radiation passing through matter; sources and detectors of nuclear radiation are discussed. Practical applications of the theory of atomic and nuclear physics are given.						+	+	+			
13		PD	EC	Optical Spectroscopy	Objective: to study the principles and instrument base of optical spectroscopy, the features of studies of the properties of materials using optical spectroscopy methods. Contents: the structure and spectroscopic properties of atoms, ions and molecules are considered; the fundamental foundations of the interaction of radiation with matter. The principles of operation and the main characteristics of the components of optical spectroscopic systems are described; the fundamental physical models describing optical phenomena and explaining the results of						+	+	+			

					experiments. Methods of optical spectroscopy of substances (gases, liquids, crystals, various materials based on them, films, composite materials, nanomaterials, etc.), as well as spectroscopy methods using lasers are discussed.													
14		PD	EC	Selected Chapters of Condensed Matter Physics	Purpose: to form students' ability to apply methods of materials research based on the principles of condensed matter physics. Contents: the problems of condensed matter physics and their solutions, physical mechanisms of crystal formation, crystal structure defects, electronic theory of condensed matter are considered. The main methods of experimental investigation of the structure, phase composition of a substance and its physical and mechanical properties and functional characteristics; electronic processes in nanocomposites and optoelectronic film devices are described. Methods of mathematical description of processes and methods of solving practical problems in the professional field are discussed.						+	+		+			
15		PD	EC	Methods of Nanomaterials Research	Purpose: to form the ability to apply modern methods of nanostructure research, to reveal the essence of the processes occurring in nanomaterials. Contents: the main ways of obtaining nanomaterials, their types, structures and properties are considered; characteristics, patterns and models of physico-chemical processes of their production; synthesis of nanomaterials "bottom up" and "top down", methods of studying nanomaterials and their physico-chemical properties are discussed: microstructural analysis, optical and electron microscopy, diffraction analysis, spectral analysis methods, determination of the specific surface area and sizes of nanoparticles;						+	+		+			

					examples of practical use of nanomaterials and nanotechnologies are given.												
16	Innovative processes in education	PD	EC	New Educational Technologies in the Process of Teaching Physics	Purpose: to expand the understanding of modern educational technologies in teaching physics Content: modern teaching technologies, techniques and methods of using digital technologies in conducting training sessions implemented in educational and extracurricular activities are analyzed. Their features of constructing cognitive activity of students during the introduction of innovative technology into the learning process are investigated. The possibilities of using innovative technologies in teaching physics are shown; planning of the learning process in accordance with a certain technology and ways of evaluating the educational effects of a particular technology. Examples of the use of digital technologies, diagrams and diagrams to illustrate their texts in physics lessons are given.			+			+	+				+	
17		PD	EC	Didactic Bases of Methods of Teaching Physics	Purpose: to form the ability to implement a certain learning technology by analyzing the results of its use in the educational process. Contents: the basics of the didactic process, its laws and principles, structural components and their functions are considered. The content of the activity of the teacher and the trainees when using various teaching methods is analyzed. The didactic features of the methods of teaching physics are described. The means of teaching physics and their application in the educational process are described. Calculations of physical quantities in solving problems and processing experimental results are given.						+	+				+	+

18		BD	EC	Physical Applications of Differential Equations	Purpose: to show the use of the basic methods of the theory of differential equations in solving physics problems. Contents: examines the concepts and methods of the theory of ordinary differential equations, the standard form of the simplest differential equations and ways to solve them, geometric and physical problems leading to the simplest differential equations of the first order. Sets out the algorithm for composing a differential equation according to the condition of the problem. Explains the way to obtain some standard physics formulas. Examples of solving problems leading to differential equations are given. The proof of some standard formulas of physics is made.							+	+				
19		BD	EC	Application of Criteria-Based Assessment in Teaching Physics at the university	Purpose: to form an idea of the system of criteria assessment in teaching physics Content: the theoretical foundations of the criterion assessment and the features of its application to the educational activities of students, classification and types of knowledge assessment are considered. The requirements for the system of criteria evaluation are outlined; methods of drawing up a criterion scale; evaluation criteria without descriptors and with descriptors. Examples of the development of criteria for evaluating laboratory work and solving physical problems, the presentation and the completed scientific project are given; the system of converting points into an assessment is discussed.						+						+
20		PD	EC	The use of Pedagogical Methods of Action Research and Lesson Study in Teaching Physics	Purpose: to form students' skills in planning, implementing and analyzing the effectiveness of using Lesson Study, Action Research approaches in teaching physics. Content: the implementation of the approach for the study of the Lesson Study class is considered, the stages of this approach are:			+			+					+	

					planning, conducting a research lesson, analyzing it, rescheduling taking into account the results obtained in the learning process. The characteristics of the stages are discussed in order to analyze the reaction of the "studied" students to the method used, as well as the experience gained for further improvement of teaching methods. The stages of the implementation of the Action Research approach are described, examples of the implementation of the Action Research approach in a real class are given.													
21		PD	EC	Development of Research Competence of Students in the Process of Teaching Physics	Purpose: to show the ways of formation of research competence in the process of teaching physics. Content: the definition of the concepts of "research competence", "research training" and "research work" is given. The theory and practice of developing students' research competence, the theoretical foundations of the methodology of involving students in research activities are considered. A model of a methodological system for the development of students' research competence based on activity and personal approaches is presented. The components of this model are discussed; the means of implementing a methodological system and diagnostic tools for the development of research competence. A set of tools for performing research works that contribute to the development of research competence is given.		+	+		+	+	+					
22		PD	EC	Management of Scientific and Pedagogical Research	Purpose: to form an idea of management in scientific and pedagogical research. Content: the concept of management in science and education, general, private and special management laws are considered. The mechanism of formation of management principles, the external and internal		+		+	+					+		

					environment of the organization of science and education, management decision and its stages, management approaches, methods of development and decision-making are described. Tasks and methods of human resources management, methods of motivation, approaches to conflict management. The issues of the organizational structure of the management system of scientific projects at the university, the main directions of improving the efficiency of scientific activity of the university were discussed.													
23		PD	EC	Management Methods in Education and Coaching Workshop	Purpose: to form an idea of the theoretical foundations of the methods of management of the educational system and the technology of coaching. Contents: modern paradigms in the subject area of science are presented, guidelines for the development of education, theoretical foundations of the organization of research activities. The analysis and evaluation of various theories and concepts for the construction of a system of continuing education is carried out. The basic concepts and principles underlying coaching, the basic principles of coaching, the technology of coaching, tasks and techniques of each stage are considered. The role of external and internal motivation in achieving goals, methods of actualization of internal motivation, criteria for the effectiveness of coaching are discussed.			+	+					+		
24		PD	EC	Computer Technologies in Physical Science and Education	Purpose: to form an idea of modern information technologies used to solve a wide range of physics problems. Contents: the three main components of the modeling process are considered, information systems and their classification, architecture, computer and the functioning of its main constituent elements, the organization of						+		+		+	+

					computer networks. The functions of the Internet, specialized and universal software products in scientific research, their characteristics and classification are described. Numerical modeling of physical processes and the implementation of models based on the Basic and Pascal programming languages are discussed. Examples of solving problems using computer software are given.													
25		PD	EC	Methodology and Technology of Organizing Distance Learning in Physics at the University	Purpose: to form an idea of the methodology and technology of the organization of distance learning in physics at the university. Content: methodological issues of distance learning and e-learning methods are considered; organization of various forms of interactive contact work of the student with the teacher, including webinars. The seminars and trainings, the organization of collective work, the use of distance learning technologies for the organization of forms of current and intermediate control are discussed. The features of the organization of the educational process using distance learning technologies are studied, taking into account the achievements of science, modern educational practice and advanced pedagogical experience.						+		+		+	+
26	Artificial Intelligence in Education	PD	EC	Organization of Computer Laboratory Work on Physics	Objective: to improve knowledge of physics with the help of computer laboratory work. Content: examines the use of a computer for computer laboratory work. Sets out the methods of organizing and conducting computer laboratory work in accordance with the purpose of the lesson. Describes the methodology for creating exercises (qualitative tasks; experimental tasks; research tasks) based on the experiment. Explains the methods of computer raster graphics and animation elements using a programming language, the construction of computer models in physics. The method of						+			+	+	+

					using computer laboratory work from PhET and a computer program from Vladimir Vascak is given.													
27		PD	EC	Formation of ICT-competence of Future Teachers of Physics	Purpose: to form an idea about the use of ICT tools in the educational process. Content: the concept of "ICT competence" and its components are defined. Professional tasks and ICT competence of a physics teacher are considered. Educational portals and Internet sites in the field of natural science education and digital educational publications on physics on CD are analyzed. The problems of the formation of ICT competence, the theoretical foundations of the methodological system of its formation in the classroom on the course of general physics, the criteria for its formation in future teachers are presented. The use of ICT in the independent work of students and in their educational and research activities is discussed.						+		+		+	+
28		PD	EC	Artificial Intelligence and Machine Learning	The goal is to develop the ability to apply machine learning methods to control and predict the behavior of physical systems. Content: the use of a programming language in machine learning is considered. The simplest methods, neural networks of various structures, and the scope of their applicability are described. Optimization algorithms, methods of selecting the appropriate structure and parameters of the method, nuances related to the set and preprocessing of input data, regression and clustering are studied. "Ab-initio" modeling of the properties of cyber-physical systems using machine learning. Examples of the application of machine learning to solve actual problems of physics are given.									+	+	
29		PD	EC	Modeling of Cyber-physical Systems Based on	Purpose: formation of theoretical knowledge and practical skills in the field of design, modeling and debugging of cyberphysical									+	+	

				Machine Learning	systems. Content: solved and unsolved problems in the field of artificial intelligence are considered. The basic concepts and methods of machine learning, the problems of formalization of reasoning, Godel's incompleteness theorem, the universal Turing machine are presented. The application of machine learning methods to tasks related to the professional field is discussed; the main stages of designing and manufacturing cyberphysical systems and the software tools used are described; formalization, engineering technology and modeling of cyberphysical systems.												
30	Module of Final Attestation			Research work of a master's student, including internship and completion of a master's thesis	Purpose: to demonstrate the consistent implementation of the dissertation work plan and its writing. Content: the student executes the dissertation plan, performs a scientific review on the research topic, based on the results of which he prepares an article; makes a list of the literature used; collects, processes scientific information on the topic of the dissertation; applies or develops modern research methods, research tools; solves research tasks using modern methods of processing, verification and presentation of scientific data; prepares an article, an abstract and a dissertation.		+	+			+	+					
31				Execution and Defense of Master Thesis	Objective: to evaluate the achieved learning outcomes and mastered competencies upon completion of the study of the Master's degree program. Content: a master's student prepares a dissertation work according to the requirements for such works, as well as the requirements of the university's QMS; makes a scientific report on the main results of the prepared dissertation, performed on the basis of the results of research work. When defending a dissertation, a master's		+	+			+	+					

					student must demonstrate his research and pedagogical competencies acquired during his master's studies and their compliance with the requirements of the educational program.												

5. SUMMARY TABLE SHOWING THE VOLUME OF LOANS IN THE CONTEXT OF THE MODULES OF THE EDUCATIONAL PROGRAM

Course of study	Term	Number of modules to be mastered	Number of subjects studied		Number of credits KZ					Total in hours	Total loans KZ	Quantity	
			BD	EC	Theoretical training	Pedagogical practice	Research practice	RWM	Execution and Defense of Master`s Thesis			Exam	Diff. credit
1	1	5	4	2	29			1		900	30	7	2
	2	5	1	4	22	4		4		900	30	4	2
2	3	4		2	11		6	3		600	20	2	2
	4	4		3	16			4		600	20	3	1
	5	1						12	8	600	20		1
Total		7	5	11	73	4	6	24	8	3600	120	16	8

6. STRATEGIES AND METHODS OF TRAINING, MONITORING AND EVALUATION

Strategies and learning	**Student - centered learning**: **the** learner is the center of teaching/learning **and an active** participant in the process of learning and decision-making. **Practice-oriented learning**: focus on the development of practical skills.
Teaching methods	Conducting lectures, seminars, various types of practices with: • application of innovative technologies: • problem learning; • case study; • group work and creative groups; • discussions and dialogues, intellectual games, olympiads, quizzes; • methods of reflection, projects, benchmarking; • Bloom's taxonomy; • presentations; • rational and creative use of information sources : • multimedia educational programs ; • electronic textbooks ; • digital resources . Organization of independent work of students, individual consultations.
Monitoring and assessing the achievability of learning outcomes	**Current control** on each topic of the discipline, control of knowledge in classroom and extracurricular activities (*according to the syllabus*). Evaluation forms: • surveys; • testing topics of academic discipline; • testpapers; • protection of independent creative works; • discussions; • trainings; • colloquia; • essay , etc. **R intermediate control** at least two times during one academic period within the same academic discipline. **Intermediate certification** is carried out in accordance with the working curriculum, academic calendar. Conduct forms: • examination in the form of testing; • oral exam; • a written exam; • combined exam; • protection of projects; • protection of reports on practices . **Finalstatecertification.**

7. TRAINING AND RESOURCE SUPPORT OF THE EP

Information Resource Center	The structure of the OIC includes 6 subscriptions, 16 reading rooms, 2 electronic resource centers (ERC). The network infrastructure of the JIC is based on 180 computers with Internet access, 110 workstations , 6 interactive whiteboards, 2 video doubles, 1 video conferencing system, 3 A-4 format scanners, the JIC software - AIBS "IRBIS-64" under MS Windows (basic set of 6 modules), stand-alone server for uninterrupted operation in the IRBIS system. The library fund is reflected in the electronic catalog available to users on the site http://lib.ukgu.kz on -line 24 hours 7 days a week. Thematic databases of their own generation have been created: "Almamater", "Proceedings of SKSU scientists", "Electronic archive". Online access from any device 24/7 via external linkhttp://articles.ukgu.kz/ru/pps . Catalogs are processed electronically. EC consists of 9 databases: "Books", "Articles", "Periodicals", "Proceedings of the teaching staff of SKSU", "Rare Books", "Electronic Fund", "SKSU in Print", "Readers" and "SKR". The JIC provides its users with 3 options for accessing its own electronic information resources: from the "Electronic Catalog" terminals in the catalog hall and divisions of the JIC; through the information network of the university for faculties and departments; remotely on the website of the library http://lib.ukgu.kz/ . Open access to international and republican resources: "SpringerLink", "Polpred", "Web of Science", "EBSCO", "Epigraph", to electronic versions of scientific journals in the public domain, "Zan", "RMEB", "Adebiet" , Digital library "Aknurpress", "Smart-kitar", "Kitar.kz", etc. For people with *special needs* and disabilities, the library website has been adapted to the work of visually impaired users
Material and technical base	For the preparation of undergraduates in this direction, there is an appropriate material and technical base of the specialty, that is, classrooms, laboratories, a computer class that meets the requirements of the SES. The Department of Physics includes 6 classrooms: mechanics and molecular physics, electromagnetism, the TSE Laboratory and astronomy, optics, atomic and nuclear physics (an interactive whiteboard is installed here) and a computer class. There is a specialized scientific and technical experimental base in the laboratories of the center "SAPA" and "IRLIP", where EP 7M01520 - "Physics" meets sanitary and technical standards and provides all types of practical, disciplinary training, research work of undergraduates provided for in the working curriculum of the specialty.

APPROVAL SHEET

according to the Educational program 7M01520-Physics

Director of the DAQ	Naukenova A.
Director of the DAS	Nazarbek U.
Director of the DE&C	Bazhirov T.