Ministry of Science and Higher Education of the Republic of Kazakhstan
K. Zhubanov Aktobe Regional University

"APPROVED"
By the decision of the Board of Directors
of the Non-Profit Joint-Stock Company
"K. Zhubanov Aktobe Regional
University"
(Protocol No. ___dated "__" _____
202_)

MODULAR EDUCATIONAL PROGRAM

Field of Education Code and Name: 7M01 – Pedagogical Sciences
Training Area Code and Name: 7M015 – Teacher Training in Natural Science Subjects
Educational Program Code and Name: 7M01502 – Physics

Level of Education: Master's degree
Awarded Degree: Master of Pedagogical Sciences in the educational program "7M01502 – Physics"

Total Number of Credits: 120 academic credits / 120 ECTS

Year of Admission: 2023.

Compilers:

Full Name	Position	Contact Information
Employers: Tleumagambetova K.E.	Director of the State Institution "Aktobe Regional Specialized Physics and Mathematics Boarding School", Aktobe	8-702-251-56-04
Aymukatov T.G.	Director of the State Institution "Secondary General Education IT School-Lyceum No.72 named after Abish Kekilbayuly", Aktobe	8(7132)45-36-96
Moldazharova L.T.	Director of the State Institution "Secondary School-Gymnasium No.21 with Trilingual Education", Aktobe	8(7132)73-05-73
Daribayeva G.Zh.	Director of the State Institution "Gymnasium No.51", Aktobe	8(7132)98-11-72
Toyshymanova M.K.	Director of the State Institution "Specialized Gymnasium No.21 named after Al-Farabi", Aktobe	8 (7132)51-15-89 8-702-329-69-97
Kasymova A.T.	Director of the State Institution "Secondary School-Lyceum No.23 named after Alimkhan Yermekov", Aktobe	8(7132)51-15-89
Responsible Compilers from the Department: Shugayeva T.Zh.	Lecturer, Department of Physics	8-701-779-33-09
Рецензенты: Tleumagambetova K.E.	Director of the State Institution "Aktobe Regional Specialized Physics and Mathematics Boarding School", Aktobe	8-702-251-56-04

1. University Mission, Vision, and Values

MISSION: Development of human capital for innovative transformation of the region and the country.

VISION: Leading positions in the national rankings and achieving the status of a flagship university of Kazakhstan.

VALUES:

- ✓ Academic excellence
- ✓ Integrity
- ✓ Openness and collaboration
- ✓ Highest quality of education
- ✓ Social engagement and civic initiative
- ✓ Leadership and creativity
- ✓ Respect and care for people
- ✓ Unity of science and innovation

2. Model of a University Graduate

- ✓ Possesses deep knowledge and understanding of the field of study
- ✓ Ready for professional self-realization in the modern world
- ✓ Entrepreneurial, capable of making decisions and creating new opportunities
- ✓ Adaptive to global challenges
- ✓ A person with high intelligence
- ✓ Demonstrates global citizenship

3. Master's Degree Program Profile

Field of Application	– Experimental, theoretical, and applied physics, as well as related natural and technical sciences. – Education, including pedagogy, theory, and methodology of teaching physics in higher educational institutions.
Program Code and Title:	7M01502 – Physics
Regulatory Framework:	1. Guidelines for the Use of the European Credit Transfer and Accumulation System (ECTS), 2015. 2. Professional Standard "Teacher" (Annex to 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). 3. "Rules for Organizing the Educational Process Using Credit Technology" (Order of the Minister of Education and Science of the Republic of Kazakhstan No. 563 dated October 12, 2018). 4. State Compulsory Educational Standard of Higher Education (Order No. 604, dated October 31, 2018). 5. Classifier of Areas of Training for Higher and Postgraduate Education (Order No. 569, dated October 13, 2018). 6. Rules for Organizing Dual Education (Order No. 50 dated January 21, 2016, as amended on September 11, 2018). 7. Model Rules for Educational Institutions Implementing Higher and (or) Postgraduate Education Programs (Order No. 595 dated October 30, 2018). 8. Model Curricula for General Education Disciplines in Higher and (or) Postgraduate Education Institutions (Order No. 603 dated October 31, 2018). 9. Law of the Republic of Kazakhstan "On Education" dated June 27, 2007 No. 319-III (with amendments and additions). 10. System of Coding Academic Disciplines in Higher and Postgraduate Education. SCES RK 5.05.001-2005. 11. Regulation on the Organization and Implementation of Professional Practice and Identification of Organizations as Practice Bases (Protocol No. 3 dated 09.11.2018).

	12. Regulation on the Ongoing Monitoring of Progress and Interim Certification (Examination Session) of Students (Protocol No. 3 dated 09.11.2018). 13. Regulation on Final Certification of Students (Protocol No. 3 dated 09.11.2018). 14. Sectoral Qualifications Framework in the field of "Education". 15. Regulation on the Development of Modular Educational Programs (Protocol No. 13 dated 12.08.2020).
Training Profile Map	
Program Objective:	Preparation of competitive masters with theoretical knowledge and practical skills in specific areas of physics, possessing basic knowledge pedagogy of higher education.
Graduate Qualification Characteristics	
Degree Awarded:	Master of Pedagogical Sciences in the Educational Program "7M01502 – Physics"
List of Possible Positions:	- Professional specialist in the field of education - Specialist in teaching methodology - Lecturer of physics and methodology of physics teaching in universities - Physics teacher in secondary schools and colleges - Pedagogue-moderator, pedagogue-researcher
Field of Professional Activity:	Graduates of the program 7M01502 – Physics may work in: ✓ Experimental, theoretical, and applied physics, as well as related natural and technical sciences ✓ Education, including pedagogy, theory, and methodology of teaching physics in higher education institutions
Functions and Types of Educational Activity	**Functions:** • Teaching • Upbringing (educational guidance) • Research • Scientific research • Methodological support • Social and communicative activity **Types of Educational Activity:** • Scientific research

	• Pedagogical and methodological • Organizational and administrative

4. Expected Learning Outcomes of the Educational Program

1. To have fundamental scientific and vocational training in the field of physics, to own modern information technologies, including methods of studying, processing and storage of scientific information.
2. To be able to formulate and solve modern scientific and practical problems on physics, to organize and conduct research, experimental and research activities for the chosen direction.
3. To apply the gained knowledge at the solution of specific scientific and practical and other physical objectives.
4. To own the culture of thinking and a public statement; the correct and logical registration of the thoughts in an oral and written form, participation in discussions on professional problems.
5. To acquire new knowledge in the field of physics, using modern educational technologies.
6. To solve physical problems of research and applied character, to carry out statistical processing of results of an experiment, to carry out mathematical, physical and numerical modeling of properties of objects and processes.
7. To know languages in spheres of social and scientific communication; to be capable to continue training and to conduct professional activity in the foreign-language environment.
8. To use methods of the social humanities in various spheres of the professional activity.

5. Modular Curriculum

5.1 Modular Curriculum for 2023–2025 (Scientific and Pedagogical Track, 2 Years)

Cycle/ Component	Code of the Discipline	Title of the Discipline	Semester	Credit	Number of ECTS Credits	Form of Assessment	Budgeted Student Workload Hours							Distribution by Courses and Semesters of the Educational Program			
							Total Number of Hours	Number of Contact Hours	Classroom Activities			Independent Work		Year 1		Year 2	
									Lectures	Laboratory Work	Practical/Seminar Classes	IWSIW	IWS	1st Semester	2nd Semester	3rd Semester	4th Semester
Module 1 – General Education, 15 academic credits																	
BD UC	HPS 5201	History and philosophy of science	1	3	3	exam	90	30	15		15	15	45	3			
BD UC	FL (P) 5202	Foreign language (professional)	1	3	3	exam	90	30			30	15	45	3			
BD UC	PHE 5203	Pedagogy of higher education	1	3	3	exam	90	30	15		15	15	45	3			
BD UC	MP 5204	Management psychology	1	3	3	exam	90	30	15		15	15	45	3			
BD UC	OPSR 5205	Organization and planning of scientific research	1	3	3	exam	90	30	15		15	15	45	3			
Module 2.1 – Teaching Methodology in the Learning Process, 31 academic credits																	
PD EC	MPTSCSS 5301	Methods of Physics Teaching in Specialized Classes of Secondary School	1	5	5	exam	150	45	15		30	25	80	5			
BD EC	MSCPCBNL T 5206	Methodology for studying the concepts of a physics	1	5	5	exam	150	45	15		30	25	80	5			

		course based on new learning technologies															
BD EC	CPE 5207	Classical physical experiments	2	5	5	exam	150	45	15		30	25	80		5		
	SRWMS	Scientific Research Work of a Master's Student	1, 2	16	16	report	480						480	5	11		
Module 2.2 – Innovative Processes in Education, 31 academic credits																	
PD UC	TMPSHSC 5301	Teaching Methods of Physics in Specialized High School Classes	1	5	5	exam	150	45	15		30	25	80	5			
BD EC	FOMPE 5206	Fundamentals of Organization and Management in Pedagogical Education	1	5	5	exam	150	45	15		30	25	80	5			
BD EC	MPE 5207	Modern Physics Experiments	2	5	5	exam	150	45	15		30	25	80		5		
	SRWMS	Scientific Research Work of a Master's Student	1, 2	16	16	report	480						480	5	11		
Module 3.1 – Information Technologies in Physics Education, 14 academic credits																	
PD UC	ICTSPE 5302	Information and Communication Technologies in School Physics Experiments	2	5	5	exam	150	45	15		30	25	80		5		
PD UC	DCTTSNPP 5303	Development of Critical Thinking Through Solving Non-standard Physics Problems	2	4	4	exam	120	40	20		20	20	60		4		
BD EC	ICRI 5208	Informatization and Computerization in Research Institutes	2	5	5	exam	150	45	15		30	25	80		5		
Module 3.2 – ICT and Modern Physics, 14 academic credits																	
PD UC	ICTSPE 5302	Information and Communication Technologies in School	2	5	5	exam	150	45	15		30	25	80		5		

		Physics Experiments															
PD UC	DCTTSNPP 5303	Development of Critical Thinking Through Solving Non-standard Physics Problems	2	4	4	exam	120	40	20		20	20	60		4		
BD EC	ITE 5208	Information Technologies in Education	2	5	5	exam	150	45	15		30	25	80		5		
Module 4.1 – Nanotechnologies in Materials Science, 20 academic credits																	
PD EC	PFS 6304	Physical Foundations of Superconductivity	3	5	5	exam	150	45	15		30	25	80			5	
PD EC	PN 6305	Physics of Nanotechnologies	3	5	5	exam	150	45	15		30	25	80			5	
PD UC	MSTSM 6306	Materials Science and Technology of Structural Materials	4	5	5	exam	150	45	15		30	25	80				5
PD EC	ADLPT 6307	Application of a Digital Laboratory in Physics Teaching	4	5	5	exam	150	45	15		30	25	80				5
Module 4.2 – Physics of Condensed Matter, 20 academic credits																	
PD EC	PCMCS 6304	Physics of Condensed Matter and Complex Systems	3	5	5	exam	150	45	15		30	25	80			5	
PD EC	STSSP 6305	Special Topics in Solid State Physics	3	5	5	exam	150	45	15		30	25	80			5	
PD UC	MSTSM 6306	Materials Science and Technology of Structural Materials	4	5	5	exam	150	45	15		30	25	80				5
PD EC	CIMP 6307	Current Issues in Modern Physics	4	5	5	exam	150	45	15		30	25	80				5
Module 5 – Practice and Scientific Research, 40 academic credits																	
BD UC	TP	Teaching Practice	3	5	5	se	150						150			5	
	SRWMS	Scientific Research Work of	3,	8	8	report	240						240			5	3

		a Master's Student	4														
PD	RP	Research Practice	3, 4	19	19	report	570					570			10	9
	FC	Final Certification	4	8	8	se	240					240				8
TOTAL:				**120**	**120**		**3600**	**595**	**215**	**0**	**380**	**320**	**2685**	**30**	**30**	**30**	**30**
		within the BD UC cycle		15	15		450	150	60	0	90	75	225	15	0	0	0
		within the BD EC cycle		15	15		450	135	45	0	90	75	240	5	10	0	0
		within the BD Practice cycle		5	5	se	150	0	0	0	0	0	150	0	0	5	0
	TOTAL	**within the BD cycle**		**35**	**35**		**1050**	**285**	**105**	**0**	**180**	**150**	**615**	**20**	**10**	**5**	**0**
		within the PD UC cycle		19	19		570	175	65	0	110	95	300	5	9	0	5
		within the PD EC cycle		15	15		450	135	45	0	90	75	240	0	0	10	5
		within the PD Practice cycle		19	19	report	570	0	0	0	0	0	570	0	0	10	9
	TOTAL	**within the PD cycle**		**53**	**53**		**1590**	**310**	**110**	**0**	**200**	**170**	**1110**	**5**	**9**	**20**	**19**
		Final Certification		8	8	se	240	0	0	0	0	0	240	0	0	0	8
		Scientific Research Work of a Master's Student		24	24		720	0	0	0	0	0	720	5	11	5	3
TOTAL:				**120**	**120**		**3600**	**595**	**215**	**0**	**380**	**320**	**2685**	**30**	**30**	**30**	**30**

6. Educational Program Map (Scientific and Pedagogical Track, 2 Years)

Cycle/ Component	Code of the Discipline	Module Components	Semester	Credit	Number of ECTS Credits	**Learning Outcomes**
1	*2*	*3*	*4*	*5*	*6*	*7*
Module 1 – General Education, 15 academic credits						
BD UC	HPS 5201	History and philosophy of science	1	3	3	LO1; LO3
BD UC	FL (P) 5202	Foreign language (professional)	1	3	3	LO5
BD UC	PHE 5203	Pedagogy of higher education	1	3	3	LO6
BD UC	MP 5204	Management psychology	1	3	3	LO4, LO8
BD UC	OPSR 5205	Organization and planning of scientific research	1	3	3	LO1; LO2; LO5
Module 2.1 – Teaching Methodology in the Learning Process, 31 academic credits						
PD EC	MPTSCSS 5301	Methods of Physics Teaching in Specialized Classes of Secondary School	1	5	5	LO1; LO6
BD EC	MSCPCBNLT 5206	Methodology for studying the concepts of a physics course based on new learning technologies	1	5	5	LO1; LO6; LO4
BD EC	CPE 5207	Classical physical experiments	2	5	5	LO4; LO6
Module 2.2 – Innovative Processes in Education, 31 academic credits						
PD UC	TMPSHSC 5301	Teaching Methods of Physics in Specialized High School Classes	1	5	5	LO1; LO6
BD EC	FOMPE 5206	Fundamentals of Organization and Management in Pedagogical Education	1	5	5	LO8
BD EC	MPE 5207	Modern Physics Experiments	2	5	5	LO1; LO3
Module 3.1 – Information Technologies in Physics Education, 14 academic credits						
PD UC	ICTSPE 5302	Information and Communication Technologies in School Physics Experiments	2	5	5	LO1; LO7
PD UC	DCTTSNPP 5303	Development of Critical Thinking Through Solving Non-standard Physics	2	4	4	LO2; LO5

		Problems				
BD EC	ICRI 5208	Informatization and Computerization in Research Institutes	2	5	5	LO2; LO7
Module 3.2 – ICT and Modern Physics, 14 academic credits						
PD UC	ICTSPE 5302	Information and Communication Technologies in School Physics Experiments	2	5	5	LO1; LO7
PD UC	DCTTSNPP 5303	Development of Critical Thinking Through Solving Non-standard Physics Problems	2	4	4	LO2; LO5
BD KB	ITE 5208	Information Technologies in Education	2	5	5	LO2; LO7
Module 4.1 – Nanotechnologies in Materials Science, 20 academic credits						
PD UC	PFS 6304	Physical Foundations of Superconductivity	3	5	5	LO4; LO8
PD EC	PN 6305	Physics of Nanotechnologies	3	5	5	LO1; LO7
PD EC	MSTSM 6306	Materials Science and Technology of Structural Materials	4	5	5	LO7; LO8
PD EC	ADLPT 6307	Application of a Digital Laboratory in Physics Teaching	4	5	5	LO7; LO8
Module 4.2 – Physics of Condensed Matter, 20 academic credits						
PD UC	PCMCS 6304	Physics of Condensed Matter and Complex Systems	3	5	5	LO4; LO8
PD EC	STSSP 6305	Special Topics in Solid State Physics	3	5	5	LO1; LO4
PD EC	MSTSM 6306	Materials Science and Technology of Structural Materials	4	5	5	LO5; LO7
PD EC	CIMP 6307	Current Issues in Modern Physics	4	5	5	LO5; LO7
Module 5 – Practice and Scientific Research, 40 academic credits						
BD	TP	Teaching Practice	3	5	5	
	SRWMS	Scientific Research Work of a Master's Student	1-4	24	24	
PD	RP	Research Internship или Research Practice	4	15	15	
	FC	Final Certification	4	12	12	

7. Summary Table Reflecting the Number of Credits Earned by Modules of the Educational Program (Scientific and Pedagogical Track, 2 Years)

Year of	Semester	Number of	Number of	Academic Credits	Total	ECTS	Quantity

Study		Modules	Courses								Hours			
			UC	EC	Theoretical Training	Teaching Practice	Research Practice	Scientific Research Work	Final Certification	Total			exam	differentiated credit
1	1	2	6	1	25			5		30	900	30	7	1
	2	2	2	2	19			11		30	900	30	4	1
2	3	1	1	3	20	5		5		30	900	30	4	2
	4	1					19	3	8	30	900	30		2
total		**6**	**9**	**6**	**64**	**5**	**19**	**24**	**8**	**120**	**3600**	**120**	**15**	**10**

8. RESOURCE SUPPORT OF THE EDUCATIONAL PROGRAM

Resource support is formed based on the requirements for the conditions of implementation of master's educational programs in the field of training 7M01502 – Physics, and includes:

- Human resource support;
- Educational, methodological, and informational support;
- Material and technical support.

8.1. Human Resource Support

The implementation of the master's educational program must be provided by academic and teaching staff who, as a rule, have a basic education corresponding to the profile of the discipline they teach and are regularly engaged in scientific and/or scientific-methodological activities.

The proportion of full-time faculty members in the Department of Physics, including those teaching core and specialized disciplines of the State Compulsory Standard, is 80%.

8.2. Educational, Methodological, and Informational Support

Educational, methodological, and informational support includes: the standard and working curriculum of the discipline, teaching and methodological support materials (TMS), syllabus, assessment and measurement materials, active handouts, didactic materials, and regulatory documents governing types of educational activities.

The educational program 7M01502 – Physics is fully provided with educational and methodological documentation and materials for all academic disciplines of the curriculum, including standard and working curricula, TMS, syllabi, assessment and measurement materials, active handouts, didactic materials, and others.

Each master's student has access to the Internet, including the university’s electronic library, the Kazakh affiliate of the Republican Scientific and Technical Library (AF RNBT), KazNEB, Clarivate Analytics, Scopus, Springer, and other resources of the university's scientific library.

The library collection is stocked with printed and electronic publications, educational and scientific literature across all disciplines of the specialty.

In addition, master’s students have contractual access to the AF RNBT collection, including access to the dissertation database of the Russian State Library.

Educational, methodological, and informational support of the learning process complies with the requirements of higher education institutions.

8.3. Material and Technical Support

The implementation of the educational program 7M01502 – Physics is supported by a material and technical infrastructure that ensures the delivery of all types of classes provided in the working curriculum and complies with current sanitary and fire safety regulations and standards.

The material and technical base includes an academic building with classrooms equipped with subject-specific rooms and laboratories, as well as computer labs for conducting classes in the specialty 7M01502 – Physics.

The Department of Physics is equipped with the following educational laboratories: Mechanics, Molecular Physics, Electricity and Magnetism, Optics, Atomic and Nuclear Physics, Astronomy, Theory of Electrical Circuits, Robotics, Methods of Teaching Physics.

In addition, the department houses scientific laboratories for: Radiation Physics of Materials, Nanotechnology, Polymer and Composite Materials.

All laboratories are equipped with modern digital equipment, allowing the conduction of practical and laboratory classes in line with the latest achievements in science and technology.

9. Characteristics of the Environment at K. Zhubanov ARSU that Support the Development of General Cultural and Social-Personal Competencies of Graduates.

The university provides all necessary conditions and opportunities to ensure the formation and development of general cultural and social-personal competencies of its graduates.

An integral part of the educational process is educational and character-building work, the purpose of which is the formation of a professional, harmoniously developed, and morally resilient individual. Special attention in this work is devoted to matters of academic discipline, behavioral culture, student appearance, the development of patriotism, civic responsibility, integrity, honesty, commitment to professional duty, law-abiding behavior, and respectful attitudes toward others and the surrounding community.

To organize cultural and recreational activities and promote a healthy lifestyle, the university has a well-developed material and technical base, including:

– Youth Palace
– Student Palace

– Two sports complexes
– Sports facility
– Three separate sports halls
– Stadium with a running track and a grass football field
– Tennis court
– Shooting range
– Multidisciplinary clinic

To support the harmonious personal development of students and master's students, which contributes to strengthening moral, civic, patriotic, and general cultural competencies, K. Zhubanov ARSU hosts various student organizations and clubs, including: Debate clubs “Ritor” and “Zaman Bizdiki”, School of Legal Knowledge, Student theater “Zhubanov Zhastary”, Young Poets Club “Tarazy”, “English Club,” “Education Club,” and “Universal Programmer Club”, KVN comedy club, Student Legal Clinic “Femida”, Charity club “Ümitiñ üzilmessin”, Volunteer club “Zhubanov Zhyluy”, Dance groups “ARSU STAR” and “Big Fam”, Public Service School “Mansap”, Various sports sections and others.

Educational and character-building work is carried out through a complex of informational and advocacy events, individual psychological support, legal education, socio-economic initiatives, moral and ethical education, cultural and leisure activities, sports events, and more.

APPROVED:

Director of the State Institution "Gymnasium No.51", Aktobe Daribayeva G.Zh.

Director of the State Institution "Specialized Gymnasium No.21 named after Al-Farabi", Aktobe Toyshymanova M.K.