Approved by the Academic Council
NJSC "Astana Medical University",
Protocol No.7
"30"/ 06/ 2023

Educational program

7R01148 - "Nuclear Medicine"

G. Astana, 2023

CONTENT

1. PASSPORT OF THE EDUCATIONAL PROGRAM

Field of education	7R01 Health care (medicine)
Areas of training	7R011 Healthcare
Group of educational programs	7R01148 Nuclear medicine
Educational program	7R01148 Nuclear medicine
Purpose of the educational program	Training of qualified , competitive specialists in nuclear medicine who meet modern requirements for the quality of doctors , who are able to work independently in nuclear medicine departments and carry out the necessary manipulations related to the diagnosis and treatment of various pathological conditions , apply and develop advanced innovative technologies in practice and science .
Type of educational program	New OP
Qualification level according to the national qualifications framework	7, nuclear medicine doctor
Qualification level by sectoral qualifications framework	VII
Distinctive features of educational programs	First developed at the Department of Radiology and Nuclear Medicine , it helps to form skills and abilities for providing qualified medical care in nuclear medicine , forms skills in mastering the latest technologies and methods in the field of radionuclide diagnostics, PET , as well as in radionuclide therapy of various tumors.
Awarded Academic Degree	Residency
Terms of study	2 years
Higher education profile	Higher medical education
Mission of the educational program	Training of a qualified nuclear medicine doctor with a system of universal knowledge and professional competencies, capable and ready for independent professional activity in the diagnosis and treatment of diseases . It was discussed at a joint meeting of the Department of Radiology and Nuclear Medicine and the Department of Radiology named after Academician Zh.Kh. Khamzabaev Protocol No. 7 dated 24.02.2023.
Accreditation and certification of educational programs	-
Requirements for the previous level of education of persons wishing to master the educational program	Basic medical education, higher medical education in the specialty "General Medicine", "General Medicine", "Pediatrics", internship
Qualification characteristics of a graduate	
List of specialist positions	Nuclear medicine doctor
Area of professional activity	healthcare

Functions of professional activity	Carrying out diagnostic studies and treatment using nuclear medicine methods
Types of professional activity	Nuclear medicine (radionuclide diagnostics, radionuclide therapy)
Accounting for the needs of different groups of students, including those with special educational needs	will be created , taking into account the diversity of special educational needs and individual opportunities.

2. GRADUATE COMPETENCES AND LEARNING OUTCOMES

1.1. General competencies and professional competencies

General competencies			
No.	**Competencies**	**Outcomes of the training program Graduates will be able to:**	**No. K**
1	nuclear medicine	applies therapeutic and diagnostic procedures through the use of radiopharmaceuticals, which are diagnostic tools and therapeutic agents	1.1
2	Communication and collaboration:	effectively interacts with the patient, his environment, healthcare professionals in order to achieve the best results for the patient	1.2
3	Safety and quality:	assesses risks and uses the most effective methods to ensure a high level of safety and quality of medical care	1.3
4	Public health:	acts within the framework of the legal and organizational field of the Ministry of Health of the Republic of Kazakhstan in the specialty, works as part of interprofessional teams to implement the policy of strengthening the nation	1.4
5	Research:	formulates research questions, effectively uses international databases in his daily activities, participates in the work of the research team	1.5
6	Education and development	learns independently and trains other members of the professional team, actively participates in discussions, conferences, symposiums	1.6
Professional competencies			
1	Questions of medical physics, radiation pharmacology and radiochemistry. Radionuclide diagnostics	effectively applies the laws of radiation physics and hygiene to conduct radionuclide diagnostics and radionuclide therapy in order to achieve the best results for the patient	1
		uses effective radiopharmaceuticals , taking into account the risk assessment of their use, pharmacokinetics, pharmacodynamics to ensure patient safety	2

		interprets the result of the radiological and nuclear medicine method after its independent implementation in a specific clinical case	3
2	Methods of radionuclide therapy	conducts effective safe radionuclide treatment, prescribing and planning it, at the same time evaluating the effectiveness, potential risks of therapy	4
		provides qualified assistance in intensive care in nuclear medicine	5

2.1.1. Competence matrix

No.	cycle / disciplines	Component	Module/ discipline name	KZ / ECTS	General competencies						Professional competencies				
					1.1	1.2	1.3	1.4	1.5	1.6	1	2	3	4	5
	PD		**Profile disciplines**	**13 8**											
1)	**PD**	**OK**	**Required Component/**	**13 4**											
1			medical physics	6	+						+				
2			Radiation pharmacology and radiochemistry	4	+			+				+			
3			Radionuclide diagnostics	48	+	+	+		+		+	+	+		
4			Radiology	1 2	+		+	+					+		
5			Radionuclide therapy	60	+	+	+	+	+	+	+	+		+	
6			Critical Care in Nuclear Medicine	4				+							+
2)		**SC**	**Selectable Component**	**4**											
1			Nuclear medicine methods in diagnosing cardiac diseases	4			+					+	+		
2			PET-CT in the diagnosis and evaluation of the effectiveness of the treatment of malignant neoplasms	4			+					+	+		
3			PET-MRI in the diagnosis and evaluation of the effectiveness of the treatment of malignant neoplasms	4			+					+	+		
4			Scintigraphic research methods in the diagnosis of internal diseases	4			+					+	+		
3)	**FE**		**final examination**	**2**											
			TOTAL	**14 0**											

2.2. Learning Outcomes

No.	Code	Learning Outcomes
1	LO-1	Radionuclide therapy and radionuclide therapy are carried out on nuclear medicine devices in accordance with the application and using large-scale information systems, quality control of radioisotope diagnostics and therapy for all cases of medical care is increased.
2	LO-2	Interpret, analyze and evaluate the results of research, effectively interact with the patient, his environment, in order to achieve the best results for the patient, develop a plan for monitoring research in various oncological diseases
3	LO-3	Comply with radiation safety requirements when working with radiation sources, radionuclides, preparation, storage, transportation and disposal of radioisotope preparations, assess risks and use the most effective methods to ensure a high level of safety and quality of medical care
4	LO-4	They operate within the framework of the legal and organizational field of the health care system of the Republic of Kazakhstan in the specialty "Nuclear Medicine". Provide basic emergency care, work as part of interprofessional teams to implement policies to promote the health of the nation
5	LO-5	Formulate adequate research questions, critically evaluate professional literature, effectively use international databases in their daily activities, participate in the work of the research team
6	LO-6	Learn independently and train other members of the professional team, actively participate in discussions, conferences and other forms of continuous professional development

2.2.1. Information about disciplines

No.	Module/discipline name	Brief description of the discipline	Cycle	Component	loans	Formed learning outcomes					
						RO 1	RO 2	RO 3	RO 4	RO 5	RO 6
Major disciplines			**PD**	**PD**	**13 8**						
Required Component			**RC**	**RC**	**13 4**						
1	medical physics	Forms knowledge and skills of the regulatory framework in nuclear medicine, conducting diagnostic methods for nuclear medicine and radionuclide therapy using knowledge and skills in applying the laws of medical physics and radiation hygiene standards, assessing the risks of nuclear medicine and radionuclide therapy methods to use the most effective of them with positions of nuclear physics	6	**RC**	6	+	+	+	+		
2	Radiation pharmacology and radiochemistry	Forms knowledge and skills of the regulatory framework and application of the principles of radiation pharmacology and radiochemistry, pharmacokinetics and pharmacodynamics of radiopharmaceuticals, determination of indications and contraindications for the use of radiopharmaceuticals, risk assessment of methods for diagnosing and treating nuclear medicine in order to use the most effective of them, taking into account the radiochemical reactions of medical isotopes	4	**RC**	4	+	+	+	+		
3	Radionuclide diagnostics	Forms knowledge and skills of the regulatory framework in nuclear medicine, conducting and interpreting nuclear medicine diagnostic methods, conducting differential radionuclide diagnostics, formulating a conclusion on the principles of evidence-based medicine and studying scientific databases, skills in assessing the risks of using nuclear medicine methods, effective interaction with the patient , his environment, healthcare professionals	48	**RC**	48	+	+	+	+	+	+

4	Radiology	Forms knowledge and skills of diagnostics using knowledge of the regulatory framework in radiology, interpretation of examination results using radiation diagnostics in normal and pathological conditions, differential and complex radiation diagnostics using nuclear medicine methods, formulating a conclusion based on scientific databases , risk assessment of radiation diagnostic methods using the best of them, interpersonal communication skills, interaction with the patient, self-study	1 2	**RC**	12		+	+	+		
5	Radionuclide therapy	Forms knowledge and skills in conducting radionuclide therapy, prescribing, planning it and assessing potential risks, effectiveness of treatment, skills in using the regulatory framework for conducting radionuclide therapy, interacting with the patient, working as part of interprofessional teams, participating in forms of continuous professional development, skills mentor and teacher for colleagues, scientific analysis in practice	60	**RC**	60	+	+	+	+	+	+
6	Critical Care in Nuclear Medicine	Forms knowledge and skills in providing qualified assistance during intensive care in nuclear medicine, including in emergencies , skills in working in interprofessional teams, analyzing scientific databases with the formulation of research questions, skills in effective compassionate interaction with the patient and his environment, skills learn on your own	4	**RC**	4		+	+	+		
Selectable Component			**RC**	**SC**	**4**	+	+	+	+	+	+
7	Nuclear medicine methods in diagnosing cardiac diseases	Forms the knowledge and skills of conducting a comprehensive radiological examination using nuclear medicine methods with the interpretation of the result to identify heart pathology, conduct differential radiation diagnostics and formulate a conclusion, according to international standards, to assess the risks of radiation diagnostic methods for this pathology	4	**SC**	4	+	+	+	+	+	+
8	PET-CT in the diagnosis and evaluation of the effectiveness of	Forms knowledge and skills of performing PET-CT with interpretation of the result to identify and evaluate the effectiveness of treatment of oncological pathology, conduct differential radiation diagnostics and formulate a conclusion, according to international	4	**SC**	4		+	+	+		

	the treatment of malignant neoplasms	standards, to assess the risks of PET-CT									
9	PET-MRI in the diagnosis and evaluation of the effectiveness of the treatment of malignant neoplasms	Forms knowledge and skills of performing PET- MRI with interpretation of the result to identify and evaluate the effectiveness of treatment of oncological pathology, conduct differential X-ray diagnostics and formulate a conclusion, according to international standards, to assess the risks of PET- MRI	4	**SC**	4		+	+	+		
10	Scintigraphic research methods in the diagnosis of internal diseases	Forms knowledge and skills of scintigraphy with interpretation of the result to identify and evaluate the effectiveness of treatment of oncological pathology of internal organs (liver, thyroid gland, etc.) , conducts differential diagnostics and formulates conclusions , according to international standards, assesses the risk and scintigraphy methods	4	**SC**	4		+	+	+		
ele ven	final examination		**2**		2						
			14 0								

3. CURRICULUM AND ASSESSMENT OF LEARNING ACHIEVEMENTS OF STUDENTS

A) Curriculum

No.	Cycle disciplines	Code disciplines	Name of the module / discipline	KZ / ECTS	Quantity hours			Number of credits by course			
					Total hours	classroom	Extracurricular	I	II	III	IV
	PD		**Profile disciplines**	**13 8**	**4 140**	**828**	**3312**				
1)	**RC**		**Required Component**	**13 4**	**4020**	**804**	**3216**				
1		MF	medical physics	6	180	36	144	6			
2		RPhR C h	Radiation pharmacology and radiochemistry	4	120	24	96	4			

No.	Cycle disciplines	Code disciplines	Name of the module / discipline	KZ / ECTS	Quantity hours			Number of credits by course			
					Total hours	classroom	Extracurricular	I	II	III	IV
3		R&D	Radionuclide diagnostics	48	1440	288	1152	48			
4		R	Radiology	1 2	360	72	288	12			
5		RT	Radionuclide therapy	60	1200	240	960		60		
6		KKNM	Critical Care in Nuclear Medicine	4	120	24	96		4		
2)	**SC**		**Selectable Component**	**4**	120	24	96		4		
1		NMMCD	Nuclear medicine methods in diagnosing cardiac diseases	4	120	24	96		4		
2		PET-CT DEETMN	PET-CT in the diagnosis and evaluation of the effectiveness of the treatment of malignant neoplasms	4	120	24	96		4		
3		PET-MRI DEETMN	PET-MRI in the diagnosis and evaluation of the effectiveness of the treatment of malignant neoplasms	4	120	24	96		4		
4		BSMSS	Scintigraphic research methods in the diagnosis of internal diseases	4	120	24	96		4		
3)	**FE**		**final examination**	**2**	**60**	**60**	**-**		**2**		
			Total	**14 0**	**4 200**	**840**	**3360**	**7 0**	**7 0**		

B) Curriculum and assessment of educational achievements by years of study:

No.	The cycle of discipline	Discipline code	Name of the discipline	department	form of control	Number of credits	ECTS	Total hours	Total classroom hours	Total non-curricular hours	SKRRN	SRR	Year of study		** Type of assessment of the final control (OIC)
					Exam								1	2	
	MD		**Cycle of major disciplines**	Profile chairs	+/+	**13 8**		**4 140**	**828**	**3312**	**2691**	**621**			
1)	**RC**		**1.Required component**		+/+	**13 4**		**4020**	**804**	**3216**	**2613**	**603**			
1		MF	medical physics		+/+	6	6	180	36	144	1 17	27	6		
2		RPhR Ch	Radiation pharmacology and radiochemistry		+/+	4	4	120	24	96	78	18	4		
3		R&D	Radionuclide diagnostics		+/+	48	48	1440	288	1152	936	216	4 8		OIK1 ; DEC2
4		R	Radiology		+/+	1 2	1 2	360	72	288	2 34	126	1 2		
5		RT	Radionuclide therapy		+/+	6 0	40	1200	240	960	7 93	1 67		60	
6		KKNM	Critical Care in Nuclear Medicine		+/+	4	4	120	24	96	78	18		4	
2)	**SC**	2308	**Selectable Component**		+/+	**4**	**4**	**120**	**24**	**96**	**78**	**18**		**4**	
		NMMCD	Nuclear medicine methods in diagnosing cardiac diseases		+/+	4	**4**	**120**	24	96	**78**	**18**		**4**	
		PET-CT	PET-CT in the diagnosis and		+/+	4	4	120	24	96	78	18		4	

		DEET MN	evaluation of the effectiveness of the treatment of malignant neoplasms												
		PET-MRI DEET MN	PET-MRI in the diagnosis and evaluation of the effectiveness of the treatment of malignant neoplasms		+/+	4	4	120	24	96	78	18		4	
		BSMSS	Bone scintigraphy in the diagnosis of metastases in the skeletal system		+/+	4	4	120	24	96	78	18		4	
3)	**FE**		**final examination**			**2**	**2**	**60**	**60**	**-**		**0**		**2**	1. Written exam 2. Assessment of practical skills
TOTAL:						**140**	**140**	**4200**	**14 0**	**3312**	**2691**	**840**	**3360**	**70**	

****Note:** The final control is carried out upon completion of the module in the form of an exam in two stages:

- examination in the form of a written answer on tickets-OIK1
- assessment of practical skills according to visualization - OIC2

4. EDUCATIONAL RESOURCES

4.1 Logistics

A) Information about the useful training area, the availability of material and technical base and technical means of training NJSC "MUA"

Type of building (standard design, fixture, other), actual address of buildings used for the educational process	Total area (m^2)	Usable area (m^2)	Educational premises, sq.m.	Type of premises (rooms, lecture halls, for practical classes, laboratories, assembly and sports halls, etc.), social and other purposes, their number
Clinical-Academic Department of Radiology and Nuclear Medicine, KF "University Medical Center" Nazarbayev University, Department of Nuclear Medicine	300.0	2 6 0.0	6 0.0	Lecture rooms - 1 ; study rooms - 1 ; professor's office, associate professor - 1; assistants' office - 1
RSE on REM "Hospital of the Medical Center of the UDP RK" Center for Nuclear Medicine	250.0	150,0 _ _	50.0	Lecture rooms - 1 ; study rooms - 1 ; professor's office, associate professor - 1; assistants' office - 1
Total	550.0	410.0	110.0	

B) Information about the availability of a food facility that meets sanitary rules and regulations

At each clinical base (medical organizations) there are catering facilities (canteen, buffet, cafe) that comply with sanitary rules and regulations.

Type of building (standard design, fixture, other), actual address of buildings used for the educational process	Total area (m^2)	Type of premises (rooms, lecture halls, for practical classes, laboratories, assembly and sports halls, etc.), social and other purposes, their number
Clinical-Academic Department of Radiology and Nuclear Medicine, KF "University Medical Center" Nazarbayev University, Department of Nuclear Medicine	300.0	Buffet
RSE on REM "Hospital of the Medical Center of the UDP RK" Center for Nuclear Medicine	250.0	Buffet

C) Information about the availability of medical care, including the availability of a medical center and a license for medical activities of NJSC "MUA"

The actual address of the building occupied by the educational process	The area of the medical center (m^2)	Information about the license for medical activities (number)
LLP "Medical Center MUA", Saryarka Ave., 33	772.3	License number 10584 DZ No. 0159763 dated 04.10.2011

4.2 Investment in education program

Name of investment	Sum	Year of purchase	Used for a contingent of students
Medical equipment	277 139 303	2016-2020	For residents of all years of study
Computers and duplicators	230 806 485	2016-2020	
Furniture	34 937 608	2016-2020	
Other	401 112 455	2016-2020	
Library fund	474 614 958	2016-2020	
Intangible assets	71 382 086	2016-2020	
Total	**1 489 992 895**		

4.3 Practical/clinical training resources

A) Characteristics of the bases

No./n	Name of clinical sites	Legal address	No. and date of the contract	Name of EP disciplines	Department/course
1	Clinical-Academic Department of Radiology and Nuclear Medicine, KF "University Medical Center" Nazarbayev University, Department of Nuclear Medicine	Syganak street, 46 Nura district, Astana, Z05K7A4	№ 23.124-18-164 04/29/2019	All disciplines	Profile departments / residents of all years of study
2	RSE on REM "Hospital of the Medical Center of the UDP RK" Center for Nuclear Medicine	st. E-495, No. 3, Yesil district, 010000 Astana	No. 5.2.2 - D152 of 04/05/2022	nuclear medicine	Profile departments/residents of all years of study

4.4 Information technology

A) Library

Name of the library	The total area of the library premises, sq. m.	Book storage area sq.m.	Number of seats in the reading rooms	Number of pickup points
Library	2269.3 sq.m.	1452.3 sq.m.	187	7

B) Book fund

The library has an educational, scientific, foreign, rare, art subscription, 5 reading rooms (reading room for educational subscription 1, 2 courses - 25 seats, a rare fund room - 12 seats, a reading room for a foreign loan - 31 seats, a room for unpublished materials - 2, teaching staff room - 36 seats, coworking room - 53 seats, multimedia room - 28 seats

C) Book Fund (According to Appendix 2 to the qualification requirements)

Total	Including:			Of the total																			
				textbooks				scientific literature				Fiction			Periodicals				Electronic editions				
	in Kazakh language	into Russian	into english	Total	in Kazakh language	into Russian	in	Total	in Kazakh	into Russian	in	Total	in Kazakh language	into Russian	Total	in Kazakh language	into Russian	in English	Total	in Kazakh language	into Russian	in English
5994	3	370	1200		0	2	61		0	250	300		0	500		0	10	100		3	120	**200**

D) Information resources of the library

Number of computers in the library	Of which with access to electronic databases
60	36

E) Electronic resources (list of electronic databases)

University residents have access to full-text articles and literature sources of world databases from Elsevier - Sciencedirect, Springerlinc , as well as corporate access to online resources ClinicalKey, Oxford universitypress , Pubmed (abstract of articles). The textbooks "Epigraph", " Newbook " "Publishing houses Epigraph - Catalog of publications Portal of multimedia textbooks" (https://mbook.kz) are provided in free access .

From December 2020 subscribed to a comprehensive integrated electronic resource platform Jaypee brothers medical publisher , which includes 3267 copies. full-text books, including over 800 basic textbooks and over 2,200 professional and reference books in English. The platform hosts more than 9,000 surgical and diagnostic videos, more than 50 journals covering 60 or more medical specialties, including related areas of health such as dentistry, nursing, physical therapy, pharmacology.

E) Information resources

Number of computers	Percentage of computers delivered 5 years or more	Number of computers connected to the Internet
63	-	36

5. RESEARCH AND SCIENTIFIC ACHIEVEMENTS

A) The main directions of scientific research of the medical organization of education (within the framework of the educational program)

Name of the topic of scientific projects/programs	Customer and funding source	FULL NAME. leader	Deadlines	Co-executing organizations, including foreign ones	Number of local (country) publications	Number of publications in near and far abroad	Number of copyright certificates, pre-patents, patents, other security documents	Number of implemented scientific and technical develop

								ments
" Implementation of new types of radioisotope studies using RFLP : 18 F - FDG , 18 F - NaF , 11 C - methionine , 18 F - DOPA "	Initiative	Rakhimzhanova R.I. Saduakasova A.B.	2023	Department of Radiology named after Zh.Kh. Khamzabaev, Department of Nuclear Medicine and NAO "MUA" Center for Nuclear Medicine	9	5	-	-
Development of a technology for labeling leukocytes with the 18- FDG radiopharmaceutical for differential diagnosis of malignant and inflammatory diseases in PET/CT studies	Initiative	Project Manager Dautov T.B., performers Saduakasova A.B., Ryskulova G.O.		Department of Radiology named after Zh.Kh. Khamzabaev, Department of Nuclear Medicine and NAO "MUA" Center for Nuclear Medicine	6	4	-	-
Production and application of labeled positron-emitting ultrashort-lived radionuclides for radioisotope diagnostics using the method of positron emission tomography / Budget program 055 "Scientific and/or scientific and technical activities", subprogram 101 "Grant financing of scientific research for 2012-2014"	budget program	Project Manager Dautov T.B., performers Saduakasova A.B., Ryskulova G.O.		Department of Radiology named after Zh.Kh. Khamzabaev, Department of Nuclear Medicine and NAO "MUA" Center for Nuclear Medicine	6	4	-	-

Investigation of the feasibility of the PET/CT method using ^{18}F- FET in nuclear medicine / According to the budget program: 217 "Development of science", subprogram 102 " Grant financing of scientific research" for 2015-2017	budget program	Project Manager Dautov T.B., performers Saduakasova A.B., Ryskulova G.O.		Department of Radiology named after Zh.Kh. Khamzabaev, Department of Nuclear Medicine and NAO "MUA" Center for Nuclear Medicine	6	4	-	-

B) Information on the participation of residents in scientific research

Name of scientific projects/research	Participation of residents (number)	Articles published (number)	Participation in local, international conferences (number)
	-	-	-

6. ACADEMIC STAFF

A) The teaching staff implementing the educational process

FULL NAME.	Job title	scientific degree	Academic title	Qualification of a specialist	Work experience	Course taught/Module	Language of	Full time / part	Achievements teacher

				(specify category)	General, years	In NJSC "MUA", years				
Rakhimzhanova R.I.	Head of the Department of Radiology named after Academician Zh.Kh. Khamzabaev	MD _	Professor	higher	33	29	Radiation diagnostics, radiation therapy	Rus, Kaz	to the fullest	has protected 11 - c.m.s.; 1 - Doctor of Medical Sciences, 4 Doctors of PhD , 4 Masters of Medicine, master's and doctoral studies, 2 provisional patents for an invention, 3 textbooks, more than 450 publications, 20 of them with an impact factor, a member of the Academic Council and the Supervisor of the School Medicine NAO MUA
Dautov T.B.	Director of the Clinical and Academic Department of Radiology and Nuclear Medicine of the KF " UMC ", Chief Freelance Specialist in Radiation Diagnostics and Interventional Radiology of the Ministry of Health of the Republic of Kazakhstan, Professor of the Department of	MD _	associate professor	higher	33	eleve n	Radiation diagnostics, radiation therapy	Rus/ kaz	to the fullest	He has 3 defended PhDs , 5 defended Masters in Medicine, 2 undergraduates and 7 PhD - doctoral students are studying, has more than 250 publications, including 30 full-fledged articles, 8 articles with an impact factor, 2 monographs, 10 inventions and a number of teaching aids

	Radiology named after academician Zh.Kh. Khamzabaev of NAO MUA									
Abdrakhmanova Zh.S.	Head of the Department of Radiology and Nuclear Medicine	MD _	Associate Professor	higher	25	23	Radiation diagnostics, radiation therapy	Eng/ Kaz/ rus	to the fullest	Has 1 textbook, more than 200 publications, 8 of them with impact factor, member of the Academic Council and the Council of the School of Medicine NAO MUA
Saduakasova A.B.	Assistant -mentor of the Department of Radiology named after academician Zh.Kh. Khamzabaev NAO MUA	MD _	-	higher	14	1	Radiation diagnostics, radiation therapy	rus	combine body	Has 1 textbook, about 50 publications, 3 of them with impact factor
Ryskulova G.O.	Assistant -mentor of the Department of Radiology named after academician Zh.Kh. Khamzabaev NAO MUA	-	master	higher	29	14	Radiation diagnostics, radiation therapy	rus	combine body	Has about 45 publications, 2 of them with impact factor Title - Master of Economics and Business

B) The scientific potential of the teaching staff necessary for the implementation of the educational program

No./ n	FULL NAME.	The number of articles in journals included in the list of KKSMON MES RK over the past 5 years	Number of journal articles indexed in international databases with a non-zero impact factor over the last 5 years	Number of titles of protection (patents, certificates of intellectual property, etc.)	Number of published books, monographs, manuals	Index-Hirsch (citation index with database indication: Scopus and WebofScience)
1.	Rakhimzhanova R.I.	10	5	10	5	Scopus *h* -index: more than 2.1
2.	Dautov T.B.	9	5	2	2	Scopus *h* -index: 2.0 -3.0
3.	Abdrakhmanova Zh.S.	6	3	3	1	Scopus *h* -index: 2.0
4.	Saduakasova A.B.					Scopus *h* -index: 2.0
5.	Ryskulova G.O.					Scopus *h* -index: 0.8

7. FINAL CERTIFICATION OF GRADUATES

The final state certification (hereinafter referred to as the FGA) is a form of state control of the clinical achievements of a resident, aimed at determining the compliance of the knowledge, abilities, skills and competencies acquired by him with the requirements of the state standard of education in the specialty .

The IGA is conducted in the form of a comprehensive exam. A comprehensive exam consists of two parts, theoretical and practical, and determines the level of knowledge of residents in the specialties. The theoretical part of the exam is conducted in the form of testing. The practical part of the exam is conducted at clinical sites in nuclear medicine centers.

The IGA of residents at the University is carried out within the time limits stipulated by the academic calendar and working curricula of specialties in the form of passing a comprehensive exam and passing practical skills.

Residents who have completed the educational process in accordance with the requirements of the working curriculum and working training programs are allowed to the final certification. The results of the comprehensive examination are documented in the form of an examination sheet provided by the Registrar's office department. Retaking a comprehensive exam from a positive grade in order to increase it to a higher one is not allowed.

Every year, external examiners from practical healthcare are introduced into the examination commissions to participate in the work of the IGA, whose recommendations are taken into account in the future to make changes to educational programs in accordance with the needs of practical healthcare.

An independent examination of graduates of the specialty "Nuclear Medicine" will be held within the framework of the requirements of the Ministry of Health of the Republic of Kazakhstan, and the Residency School.

8. CONTINUOUS IMPROVEMENT

A) Development of an educational program with the participation of associations and employers

The educational program was developed with the participation of representatives of practical healthcare from medical organizations. A review of the educational program was received from the head of the Center "Nuclear Medicine" in Astana

Discussed at a joint meeting of the staff of the Department of Radiology named after Academician Zh.Kh. Khamzabaev and the Department of Radiology and Nuclear Medicine of NAO MUA.

Minutes No. 7 dated February 28, 2023

Chairman: Head  of the Department of Radiology
named after academician Zh.Kh.Khamzabaev

Rakhimzhanova R.I.

9. REVISION, AMENDMENTS

Date of implementation of the EP	OP revision date

10. EMPLOYER REVIEWS

Name of company	FULL NAME. the head of the organization	Date of signing the review
CF " UMC " Department of Nuclear Medicine	PhD Skakova G.A.	04.04.2023
Hospital MC UDP Deputy Director for Strategic Development, Science and Education	MD Shanazarov N.A.	04.04.2023 _ _ _

11. DEVELOPERS OF THE EDUCATIONAL PROGRAM

Full name	K chair	Job title	SIGNATURE _
Rakhimzhanova R.I.	Department of Radiology named after Zh.Kh.Khamzabaev	Head of department	
Abdrakhmanova Zh.S.	Department of Radiology and Nuclear Medicine NJSC "MUA"	Head department	
Dautov T.B.	CF " UMC "	Professor	

12. EDUCATIONAL PROGRAM APPROVAL SHEET

Department/course name	Signatures of the heads of the department
Head of the Department of Radiology named after Zh.Kh. Khamzabaev Rakhimzhanova R.I.	
Head of the Department of Radiology and Nuclear Medicine Abdrakhmanova Zh.S.	

	JSC " Astana Medical University "
	Educational program nuclear medicine

Dean of the School of Residency M.K. Elubaeva	

	JSC " Astana Medical University " *Educational program* *nuclear medicine*

Dean of the School of Residency M.K. Elubaeva	