KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I.SATBAYEV

SATBAYEV UNIVERSITY

APPROVED
Chairman of the Management Board-
Rector of KazNRTU named after K.Satpayev
M.M. Begentaev
«16» 05 2024 y.

CURRICULUM

of Educational Program on enrollment for 2024-2025 academic year (Spring)

Educational program 7M07103 - "Materials science and technology of new materials"
Group of educational programs M101 - "Materials science and technology of new materials"

Form of study: full-time | Duration of study: 2 year | Academic degree: master of technical sciences

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	Classroom amount lec/lab/pr	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training based on courses and semesters			
								I course		2 course	
								1 semester	2 semester	3semester	4 semester
M-1. Module of basic training (university component)											
LNG213	English (professional)	BD UC	3	150	0/0/3	105	E	3			
HUM214	Management Psychology	BD UC	3	90	1/0/1	60	E	3			
HUM212	History and philosophy of science	BD UC	3	90	1/0/1	60	E		3		
HUM213	Higher school pedagogy	BD UC	3	90	1/0/1	60	E		3		
M - 2. Module of applied problems of materials science											
PHY712	Technological quality assurance of materials	BD, CCH	5	150	2/0/1	105	E		5		
MNG781	Intellectual property and research				2/0/1						
PHY278	Modern problems of materials and process sciences				1/0/2						
PHY711	Materials science and technologies of advanced materials	BD, CCH	5	150	2/0/1	105	E		5		
PHY280	The scientific basis and practice of application of nano				1/0/2						
PHY725	Materials research methods	BD, CCH	5	150	2/0/1	105	E	5			
MNG782	Sustainable development strategies				2/0/1						
PHY724	Structure and properties of carbon nanomaterials				2/0/1						
PHY719	Multiphase structures and methods for calculating phase diagrams	PD, UC	5	150	2/0/1	105	E			5	
PHY720	Destruction and reliability assessment of materials	PD, CCH	5	150	2/0/1	105	E			5	
PHY274	Methods for calculating phase transformations and structural analysis of materials				2/1/0,						
M-3. Advanced Materials Science Module											
PHY723	Composite materials with desired properties	PD, UC	5	150	2/0/1	105	E		5		
PHY714	New functional materials	PD, UC	5	150	2/0/1	105	E		5		
PHY716	Materials for 3D technology	PD, UC	5	150	2/0/1	105	E	5			
M-4. Nanotechnology module											
PHY717	Functional problems of materials science	PD, CCH	5	150	2/0/1	105	E	5			
PHY260	Methods for obtaining functional materials and nanostructures				1/0/2						
PHY722	Advanced materials processing technologies	PD, CCH	5	150	2/0/1	105	E			5	
PHY261	The study of functional materials by electron and probe microscopy				1/0/2						
PHY721	The surface structure engineering	PD, CCH	5	150	2/0/1	105	E			5	
PHY726	Nanomaterials and nanotechnologies in industry				2/0/1						
M-5. R&D module											
PHY718	Methodology for materials selection and technology	BD, CCH	5	150	2/0/1	105	E			5	
PHY276	Innovation in material science				2/0/1						
M-6. Practice-oriented module											
AAP273	Pedagogical practice	BD UC	8						8		
AAP269	Research practice	PD, UC	8								8

M-7. Experimental research module												
AAP251	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	2					2			
AAP241	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	3						3		
AAP254	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	5							5	
AAP255	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	14								14
M-8. Module of final attestation											
ECA212	Preparation and defense of a master's thesis	FA	8								8
	Total based on UNIVERSITY:							23	37	30	30
								60		60	

Federal State Autonomous Educational Institution of Higher Education
National Research Tomsk Polytechnic University

Educational program "Production of products from nanostructured materials and additive technologies"
Course of study 22.04.01 - "Materials science and technology of materials"

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	Classroom amount lec/lab/pr	SIS (including TSIS) in	Form of control	Allocation of face-to-face training based on			
								1 course		2 course	
								1 semester	2 semester	3semester	4 semester
M1 Block 1. Disciplines (modules)											
M1.БМ1 Модуль общенаучных дисциплин											
PHY728	Philosophical and methodological problems of science and technology	BD UC	3	108	1/0/1	76	Exam		3		
PHY729	Professional training in English	BD UC	6	216	0/0/4	152	Test	3	3		
M1.BM2 Module of general professional disciplines											
PHY730	Materials science and technologies of modern and promising materials	BD UC	6	216	1/1/1	152	Exam		6		
PHY731	High technologies: from research to business	PD, UC	3	108	1/1/1	60	Exam		3		
PHY732	Powder consolidation processes: regularities and efficiency criteria	PD, UC	3	108	1/1/1	60	Test	3			
PHY733	Technologies of zero-dimensional nanoobjects	BD UC	3	108	1/1/1	60	Test	3			
PHY734	Dimensional effects in nanomaterials	PD, UC	3	108	1/1/1	76	Test		3		
M1.BM1 Interdisciplinary professional module (part formed by participants of educational relations)											
PHY735	Modern methods of structural analysis in materials science*	BD UC	6	216	1/1/1	136	Exam	6			
PHY736	The main directions of development of materials science	PD, UC	3	108	1/1/1	60	Test	3			
PHY737	Technologies for manufacturing products from bulk nanomaterials	PD, UC	3	108	1/1/1	136	Exam		3		
M1.BM2 Module of university-wide elective disciplines											
PHY739	Psychology of communication	BD UC	2	72	1/0/1	40	Test	2			
M1.BM3 Variable interdisciplinary professional module											
M1.BM3.1 "Production of products from nanostructured materials and additive technologies"											
PHY741	Probe methods of diagnostics of the structure and properties of nanomaterials	PD, UC	6	216	1/1/1	152	Exam			6	
PHY742	Modeling of nanomaterials	PD, UC	6	216	1/1/1	152	Exam			6	
PHY743	Methods of testing the performance characteristics of nanomaterials	PD, CCH	6	216	1/1/1	152	Exam			6	
PHY744	Modern technologies of surface hardening										
PHY745	Nanomaterials and the environment	PD, CCH	6	216	1/1/1	152	Exam			6	
PHY746	Technologies for the production of powder composite materials										
M2 Block 2. Dispersed practices, including research.											
M2.B Variable part.											
PHY747	Fundamentals of pedagogical activity	BD UC	1	36				1			
PHY748	Pedagogical practice	BD UC	3	108					3		
PHY749	Research work in the semester	PD, UC	18	648				6	6	6	
M2 Block 2. Practices											
PHY750	Research work (obtaining primary skills of research work)	PD, UC	6	216						6	

PHY751	Research work	PD, UC	9	324							9
PHY752	Undergraduate Practice	PD, UC	15	540							15
M3 Block 3. State final certification											
PHY753	Master's final qualifying work (performance, preparation for the defense procedure and defense of the final qualifying work)	FA	9	324							9
								25	29	33	33

Number of credits for the entire period of study					
Cycle code	Cycles of disciplines	Credits			
			university component (UC)	component of choice (CCH)	Total
BD	Cycle of basic disciplines		20	15	35
PD	Cycle of profile disciplines		28	25	53
	Total for theoretical training:	*0*	*48*	*40*	*88*
	RWMS				*24*
FA	Final attestation	12			8
	TOTAL:	12	48	40	120

Decision of the Academic Council of Kazntu named after K.Satpayev. Protocol № 12 "22" 04 2024 y.

Decision of the Educational and Methodological Council of Kazntu named after K.Satpayev. Protocol № 6 "18" 04 2024 y.

Decision of the Academic Council of the Institute M&M. Protocol № 7 "28" 03 2024 y.

Vice-Rector for Academic Affairs _____ Uskenbayeva R.K.

Director of M&M Institute _____ Rysbekov K.B.

Head of the MN&EP Department _____ Kudaibergenov K.K.

Specialty Council representative from employers _____ Idrisova T.K.