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

SATBAYEV UNIVERSITY

APPROVED
Chairman of the Management Board-
Rector of KazNTU named after K.Satpayev
M.M. Begentaev
«__» ______ 2024 y.

CURRICULUM
of Educational Program on enrollment for 2024-2025 academic year

Educational program 6B07109 - "Engineering Physics and Materials Science"
Group of educational programs B061 - "Materials Science and Technology"

Form of study: full-time | Duration of study: 3 years shortened | Academic degree: Bachelor of Engineering and Technology

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	classroom volume of lek/lab/p	SIS (including TSIS) in hours	Form of control	I course		II course		III course	
								1 semester	2 semester	3 semester	4 semester	5 semester	6 semester
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)													
M-2. Module of physical training													
KFK 101-104	Physical Culture	GED, RC	8	240	0/0/8	120	Difcredit	2	2				
M-3. Module of information technology													
CSE 677	Information and communication technologies (in English)	GED, RC	5	150	2/1/0	105	E				5		
M-4. Module of socio-cultural development													
HUM 137	History of Kazakhstan	GED, RC	5	150	1/0/2	105	SE		5				
HUM 132	Philosophy	GED, RC	5	150	1/0/2	105	E				5		
HUM 120	Socio-political knowledge module (sociology, politology)	GED, RC	3	90	1/0/1	60	E				3		
HUM 134	Socio-political knowledge module (culturology, psychology)		5	150	2/0/1	150	E			5			
M-5. Module of anti-corruption culture, ecology and life safety base													
HUM 136	Fundamentals of anti-corruption culture	GED, CCH	5	150	2/0/1	150	E	5					
MNG 489	Fundamentals of economics and entrepreneurship												
MNG564	Basics of Financial Literacy												
HPP128	Scientific research methods												
CHE 656	Ecology and life safety												
CYCLE OF BASIC DISCIPLINES (BD)													
M-7. Basic general technical training module													
CHE127	Physical chemistry	BD, UC	5	150	1/1/1*	105	E	5					
M - 8. Materials Science Module													
PHY639	Measurement Theory and Application	PD, UC	5	150	2/1/0*	105	E		5				
PHY178	Computational Physics	BD, UC	5	150	1/0/2*	105	E		5				
PHY561	Mechanical properties of materials	BD, UC	6	180	2/1/1*	120	E	6					
PHY640	Fumdamentals of modern physics: atomic amd nuclear physics	BD, CCH	5	150	2/0/1/	105	E	5					
MNG562	Legal regulation of intellectual property				2/0/1/								
PHY589	Microstructure of Organic Materials				1/1/1/								
PHY582	Alloy steels and alloys. Cast iron	BD, UC	5	150	2/1/0*	105	E			5			
PHY590	Corrosion and protection of metal structures	BD, CCH	5	150	2/0/1/	105	E		5				
MNG563	Fundamentals of sustainable development and ESG projects in Kazakhstan				2/0/1/								
PHY591	Perspective glasses and glass materials				1/1/1/								
PHY538	Metallography	BD, UC	5	150	2/1/0*	105	E			5			
PHY641	Carbon and ceramic materials	BD, UC	4	150	1/0/2*	105	E		4				
PHY592	Structural materials	BD, CCH	5	150	2/0/1/	105	E			5			
PHY593	Paints and varnishes materials				1/1/1/								
PHY495	Physics of Strength and Plasticity				1/1/1/								
PHY584	Chemical-thermal treatment of metals and alloys	PD, UC	5	150	1/1/1*	105	E					5	
PHY476	Mechanics of Materials	PD, UC	5	150	2/0/1*	105	E					5	
PHY482	Functional materials	PD, UC	6	180	2/1/1*	120	E					6	
PHY527	Methods for producing powder materials	PD, UC	5	150	1/1/1/	105	E					5	
PHY557	Scientific basis for material selection	PD, CCH	5	150	1/1/1/	105	E						5
PHY558	Methods for calculating phase diagrams				1/1/1/								
M - 9. Module of engineering physics													
PHY555	Probing methods on materials	BD, UC	5	150	2/1/0*	105	E			5			
PHY534	Fundamentals of electricity and magnetism	BD, UC	5	150	2/1/0*	105	E	5					

PHY642	Methods for studying powder and composite materials	BD, CCH	6	180	2/1/1/	120	E					6		
PHY553	Reactor Materials Science				2/1/1/									
PHY554	Physics of Low-Dimensional Systems				2/1/1/									
PHY585	Semiconductor materials	PD, UC	4	120	2/1/0*	75	E				4			
PHY638	Polymeric material	PD, CCH	4	120	2/0/1/	75	E	4						
PHY549	Vacuum Technology				2/0/1/									
PHY594	Quality control of the materials	PD, UC	6	180	2/1/1/	120	E					6		
M - 10. Nanotechnology module														
PHY586	Introduction to nanomaterials	BD, UC	5	150	1/1/1*	105	E			5				
PHY510	Physics and optics of photovoltaics	BD, UC	5	150	1/1/1/	105	E		5					
PHY503	Methods of obtaning and research of nanostructered materials				1/0/2/									
PHY505	Methods of obtaning and research of nanostructered materials				2/0/1/									
PHY596	Graphene and materials based on it	BD, CCH	5	150	2/0/1/	105	E				5			
CSE831	Fundamentals of Artificial Intelligence				1/0/2/									
PHY511	Computer Modeling in Materials Science (thermocalc)				1/1/1/									
PHY597	Fundamentals of technological processes for the production of nanomaterials	PD, CCH	5	150	1/1/1/	105	E				5			
PHY598	Nanomaterials in electronics				2/0/1/									
PHY431	Advanced materials	PD, CCH	5	150	1/1/1/	105	E						5	
PHY480	Technologies of obtaining nanomaterials and nanosystems				1/1/1/									
PHY587	Nanomaterials and nanotechnologies in construction	PD, UC	4	150	2/0/1*	105	E						4	
M - 11. R&D module														
PHY559	Methods for studying the structure of material properties	PD, CCH	5	150	1/1/1/	105	E						5	
PHY560	X-ray diffraction and electron microscopic analysis				1/1/1/									
M - 12. Practice-oriented module														
AAP102	Production practice I	PD, UC	2						2					
AAP183	Production practice II	PD, UC	3								3			
M - 13. Module of final attestation														
ECA109	Writing and defense of the thesis	FA	8											8
M - 14. Module of additional types of training														
AAP500	Military affairs	ATT	0											
Total based on UNIVERSITY:								32	33	30	30	33	27	
								65		60		60		

Number of credits for the entire period of study					
Cycle code	Cycles of disciplines	Credits			
		required component (RC)	university component (UC)	component of choice (CCH)	Total
GED	Cycle of general education disciplines	27		5	**32**
BD	Cycle of basic disciplines		40	31	**145**
PD	Cycle of profile disciplines		50	24	
	Total for theoretical training:	*27*	*90*	*60*	*177*
FA	Final attestation	8			**8**
	TOTAL:				**185**

Decision of the Academic Council of Kaznu named after K.Satpayev. Protocol № 12 " 22 " 04 20 24 **y.**

Decision of the Educational and Methodological Council of Kaznu named after K.Satpayev. Protocol № 6 " 29 " 04 20 24 **y.**

Decision of the Academic Council of the Institute M&M. Protocol№ 7 " 28 " 03 20 24 **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.