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.

«Қ. И. Сәтбаев атындағы Қазақ ұлттық техникалық зерттеу университеті» коммерциялық емес акционерлік қоғамы * НАО «Казахский национальный исследовательский технический университет имени К.И. Сатпаева»

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: 2 years

Academic degree: Bachelor of Engineering and Technology

Discipline code	Name of disciplines	Cycle	Total amount in credits	ECTS credit	ABET credit	Total hours	classroom volume of lek/lab/pr	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training based on courses and semesters			
										I course		II course	
										1 semester	2 semester	3 semester	4 semester
	M-6. Module of physical and mathematical training												
MAT 101	Mathematics I	BD, UC	5	5	3	150	1/0/2	105	E	5			
PHY 468	Physics	BD, UC	5	5	3	150	1/1/1	105	E	5			
MAT 102	Mathematics II	BD, UC	5	5	3	150	1/0/2	105	E		5		
	M-7. Basic general technical training module												
CHE495	Chemistry	BD, UC	5	5	3	150	1/1/1*	105	E	5			
	M - 8. Materials Science Module												
PHY533	Fundamentals of materials science	BD, UC	4	4	3	120	2/1/0*	75	E	4			
PHY501	Defects in the Crystal Structure of Materials	BD, UC	5	5	3	150	1/1/1*	105	E	5			
PHY582	Alloy steels and alloys. Cast iron	BD, UC	5	5	3	150	2/1/0*	105	E	5			
PHY590	Corrosion and protection of metal structures	BD, EC	5	5	3	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	5	3	150	2/1/0*	105	E			5	
PHY641	Carbon and ceramic materials	BD, UC	4	4	3	150	1/0/2*	105	E			4	
PHY592	Structural materials	BD, EC	5	5	3	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	5	3	150	1/1/1*	105	E				5
PHY476	Mechanics of Materials	PD, UC	5	5	3	150	2/0/1*	105	E				5
PHY482	Functional materials	PD, UC	6	6	4	180	2/1/1*	120	E				6
	M - 9. Module of engineering physics												
PHY555	Probing methods on materials research	PD, UC	5	5	3	150	2/1/0*	105	E			5	
PHY585	Semiconductor materials	PD, UC	4	4	3	120	2/1/0*	75	E				4
	M - 10. Nanotechnology module												
PHY586	Introduction to nanomaterials	BD, UC	5	5	3	150	1/1/1*	105	E			5	
PHY596	Graphene and materials based on it	BD,EC	5	5	3	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, EC	5	5	3	150	1/1/1/	105	E		5		
PHY598	Nanomaterials in electronics						2/0/1/						
PHY431	Advanced materials	PD, EC	5	5	3	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	4	3	150	2/0/1*	105	E		4		
	M - 11. R&D module												
PHY599	Microstructure of Inorganic Materials	PD, EC	5	5	3	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	2						2		
AAP183	Production practice II	PD, UC	3	3	3								3
	M - 13. Module of final attestation												
ECA109	Writing and defense of the thesis	FA	8	8	8								8
	M - 14. Module of additional types of training												
AAP500	Military affairs	ATT	0										
	Total based on UNIVERSITY:			120	80					29	31	24	36
										60		60	

GE1401	University English	Electives	3										
MA1200/MA1300	Calculus and Basic Linear Algebra I/ Enhanced Calculus and Linear Algebra I	Core Courses	3										
PHY1201	General Physics I	Core Courses	3										
MSE2102	Introduction to Materials Science and Engineering	Core Courses	3										
MSE2109	Bonding and Structure of Materials	Core Courses	3										
GE2410	English for Engineering[1]	Electives	3										
MA1201/ MA1301	Calculus and Basic Linear Algebra II/ Enhanced Calculus and Linear Algebra II	Core Courses	3										
GE1501	Chinese Civilization – History & Philosophy[1]	Electives	3										
PHY1202	General Physics II	Core Courses	3										
CHEM1300	Principles of General Chemistry	Electives	3							3			
MSE2104	Mechanical Behaviour of Materials	Core Courses	3							3			
PHY1203	General Physics III	Core Courses	3							3			
GE 1355	Sustainable Energy and Environmental Engineering	Electives	3							3			
GE2105	Popular Culture	Electives	3							3			
MA2172	Applied Statistics for Sciences and Engineering	Electives	3								3		
MSE2107	Measurement Theory and Application	Core Courses	3								3		
MSE4170	Corrosion and Protection of Materials	Electives	3								3		
CS1302	Introduction to Computer Programming	Electives	3								3		
GE 2106	Philosophy and Life: A Dialogue	Electives	3								3		
GE2138	Introduction to Ethics and Public Policy	Electives	3								3		
MSE3244	Design Laboratory	Core Courses	3								3		
MSE3190	Thermodynamics of Materials	Core Courses	3									3	
MSE3195	Kinetics and Phase Transformations	Electives	3									3	
MSE3111	Ceramic Materials	Electives	3									3	
MSE3110	Deformation and Fracture	Core Courses	3									3	
MSE3171	Materials Characterization	Core Courses	3									3	
MSE2106	Quantum Properties of Materials	Core Courses	3									3	
MSE3172	Electronic Properties of Solids	Core Courses	3										3
MSE4121	Thin Films	Electives	3										3
MSE4119	Advanced Computational Methods for Materials Science and Engineers	Electives	3										3
MSE4178	Nanostructures & Nanotechnology	Electives	3										3
MSE3113	Soft Materials	Core Courses	3										3
MSE4176	Energy Materials for the Current Century	Electives	3										3
MSE 2243	Workshop Practice	Core Courses	3										3
MSE 4714	Special Topics in Materials Science and Engineering I	Electives	3										
MSE3169	Materials Testing Techniques	Electives	3										
MSE4177	Smart and Functional Materials: Selection and Application	Electives	3										
MSE2108	Materials Chemistry	Core Courses	3										
MSE4118	Composite	Electives	3										
MSE4715	Special Topics in Materials Science and Engineering II	Electives	3										
MSE4179	Advanced Materials Characterization	Electives	3										
MSE3114	Computational Methods for Physicists and Materials Engineers	Core Courses	3										
MSE5301	Instrumentation for Materials Characterization	Electives	3										
MSE 4307	Building Materials	Electives	3										
MSE4116	Dissertation	Core Courses	6										
										15	21	18	21