



National Research University Higher School of Economics (HSE)

Basic Curriculum

Field of study 03.04.02 Physics
Educational Programme "Physics"

Trajectories: "Physical Mechanics", "Physics and Technology of Nanostructures"

Implementing unit: St. Petersburg School of Mathematics, Physics and Computer Science, HSE, HSE - Saint Petersburg

Years of Study: 2024/2025 - 2025/2026

Length of Programme: 2 years

Mode of Study: Full Time

Degree: Master's degree / MBA

APPROVED
20.05.2024
Vice Rector
ROSHCHIN S.Y.
Signed with EDS

Block Code	Course	Subject type	Credits	Credits by Years		Planned Educational Programme Development Results
				1	2	
	Degree Programme		120,00	60,00	60,00	
	Physical Mechanics (Research track)		120,00	60,00	60,00	
	Key Seminars		15,00	6,00	9,00	
1	Research Seminar "Modeling in Mechanics"	C	6,00		6,00	PC-8
2	Mentor seminar "Physical mechanics"	C	9,00	6,00	3,00	GPC-4.PHY, PC-6, UC-1, UC-6
	Internship		33,00	3,00	30,00	
	Project Internship		12,00	3,00	9,00	
1	Project	C	12,00	3,00	9,00	GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, GPC-4.PHY, PC-1, PC-2, PC-3, PC-4, UC-1, UC-2, UC-3, UC-4
	Research Internship		21,00		21,00	
1	Research Internship	C	18,00		18,00	GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, GPC-4.PHY, PC-1, PC-2, PC-3, PC-4, PC-6, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
2	Preparation of final qualifying work	C	3,00		3,00	GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, GPC-4.PHY, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
	Major		54,00	42,00	12,00	
	Major		42,00	42,00		
1	Wave processes	C	6,00	6,00		PC-2
2	Mathematical physics. Asymptotic methods	C	6,00	6,00		PC-1

3	Micromechanics of heterogeneous environments	C	6,00	6,00		GPC-4.PHY, PC-1
4	Nanoplasmonics	C	6,00	6,00		GPC-1.PHY, GPC-3.PHY, GPC-4.PHY, UC-1, UC-6
5	Application of density functional theory to calculations of material properties: theoretical foundations and practical aspects	C	6,00	6,00		PC-4
6	Introduction to Experimental Optics	C	6,00	6,00		GPC-1.PHY, PC-1, UC-1
7	Selected chapters from the theory of elastic environment	C	6,00	6,00		PC-2
	Major		12,00		12,00	
1	Mechanics of Media with Microstructure	C	6,00		6,00	PC-6
2	Rational continuum mechanics	C	6,00		6,00	GPC-1.PHY, PC-2
	Magolego		15,00	9,00	6,00	
1	Optional disciplines from the university-wide MagoLego pool	E	15,00	9,00	6,00	GPC-1.PHY, GPC-2.PHY, UC-2, UC-3
	Final State Certification (FSC)		3,00		3,00	
1	Final Qualification Paper	C	3,00		3,00	GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, GPC-4.PHY, PC-1, PC-2, PC-3, PC-4, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
	Physics and Technology of Nanostructures (Research track)		120,00	60,00	60,00	
	Key Seminars		15,00	6,00	9,00	
1	Research seminar "Nanostructures and nanomaterials"	C	6,00		6,00	GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
2	Mentor's seminar "Physics and technology of nanostructures"	C	9,00	6,00	3,00	GPC-4.PHY, PC-6, UC-1
	Internship		33,00	3,00	30,00	
	Project Internship		12,00	3,00	9,00	
1	Project	C	12,00	3,00	9,00	GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, GPC-4.PHY, PC-1, PC-2, PC-3, PC-4, UC-1, UC-2, UC-3, UC-4
	Research Internship		21,00		21,00	
1	Science and Research Internship	C	18,00		18,00	GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, GPC-4.PHY, PC-1, PC-2, PC-3, PC-4, PC-6, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
2	Preparation of final qualifying work	C	3,00		3,00	GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, GPC-4.PHY, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
	Major		54,00	42,00	12,00	
	Major		42,00	42,00		

1	Automation of experimental data collection and processing	C	6,00	6,00		GPC-1.PHY, GPC-2.PHY, GPC-4.PHY, UC-2, UC-3, UC-5, UC-6
2	Introduction to Nanophotonics	C	6,00	6,00		GPC-1.PHY, GPC-2.PHY, GPC-4.PHY, UC-2, UC-3, UC-5, UC-6
3	Modeling of Quantum Systems	C	6,00	6,00		GPC-1.PHY, GPC-2.PHY, UC-1, UC-2, UC-3
4	Nanoplasmonics	C	6,00	6,00		GPC-1.PHY, GPC-3.PHY, GPC-4.PHY, UC-1, UC-6
5	Physics of Low-Dimensional Systems	C	6,00	6,00		GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, PC-1, PC-2, PC-3, UC-1, UC-2, UC-3
6	Experimental Methods for Studying the Properties of Semiconductor Nanostructures	C	6,00	6,00		GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, GPC-4.PHY, UC-1, UC-2, UC-6
7	Introduction to Experimental Optics	C	6,00	6,00		GPC-1.PHY, PC-1, UC-1
Major			12,00		12,00	
1	Quantum Transport	C	6,00		6,00	GPC-1.PHY, GPC-3.PHY, GPC-4.PHY, UC-1, UC-2, UC-3
2	Rational continuum mechanics	C	6,00		6,00	GPC-1.PHY, PC-2
Magolego			15,00	9,00	6,00	
1	Optional disciplines from the university-wide MagoLego pool	E	15,00	9,00	6,00	GPC-1.PHY, GPC-2.PHY, UC-2, UC-3
Final State Certification (FSC)			3,00		3,00	
1	Final Qualification Paper	C	3,00		3,00	GPC-1.PHY, GPC-2.PHY, GPC-3.PHY, GPC-4.PHY, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6

Curriculum agreed:

Academic Supervisor	ZHURIKHINA V.V.	08.05.2024
Dean		08.05.2024
Deputy Director	KUZMIN P.V.	08.05.2024
Head of Centre for Educational Model Design	LEPESHKIN I.A.	08.05.2024

* Subject type:

Compulsory course C

Elective course

E