



National Research University Higher School of Economics (HSE)

Curriculum

Field of study 01.03.02 Applied Mathematics and Information Science

Educational Programme "Applied Data Analysis and Artificial Intelligence"

Specializations: "Applied Data Analysis", "Data Analysis in Finance", "Machine Learning Architecture"

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

3 rd, 2024/2025 academic year

APPROVED

27.05.2024

Vice Rector

ROSHCHIN S.Y.

Signed with EDS

Length of Programme: 4 years

Years of Study: 2022/2023 - 2025/2026

Mode of Study: Full Time

Degree: Bachelor's degree

Block Code	Course	Subject type	Department	Credits	Total Academic Hours	Contact Hours	Allocation of Contact Hours				Additional Information
							1	2	3	4	
<b>Degree Programme</b>				<b>60,00</b>	<b>2 280</b>	<b>460</b>	<b>154</b>	<b>152</b>	<b>80</b>	<b>74</b>	
<b>Data Culture</b>				<b>5,00</b>	<b>190</b>	<b>28</b>		<b>14</b>	<b>12</b>	<b>2</b>	
1	External Examinations on Digital Skills. Final Level	C	отдел развития цифровых компетенций			2		2A			
2	Machine Learning	C	Informatics Department	4,00	152	24		12	12A		
3	Data Science, AI and Generative Models Independent Test. Advanced Level	C	отдел развития цифровых компетенций	1,00	38	2				2A	Online Course
<b>Major</b>				<b>37,00</b>	<b>1 406</b>	<b>306</b>	<b>126</b>	<b>106</b>	<b>34</b>	<b>40</b>	
<b>Core Professional Block (Major)</b>				<b>8,00</b>	<b>304</b>	<b>104</b>	<b>56</b>	<b>48</b>			
1	Probability Theory and Mathematical Statistics	C	Informatics Department	5,00	190	52	28A	24A			
2	Numerical and Optimization Methods	C	Informatics Department	3,00	114	52	28	24A			
<b>Elective Professional Block (Major)</b>				<b>29,00</b>	<b>1 102</b>	<b>202</b>	<b>70</b>	<b>58</b>	<b>34</b>	<b>40</b>	
<b>-</b>				<b>12,00</b>	<b>456</b>						
<b>Applied Data Analysis</b>				<b>12,00</b>	<b>456</b>	<b>192</b>	<b>34</b>	<b>58</b>	<b>72</b>	<b>28</b>	
<b>Обязательные дисциплины специализации</b>				<b>12,00</b>	<b>456</b>	<b>192</b>	<b>34</b>	<b>58</b>	<b>72</b>	<b>28</b>	
1	Introduction to Hadoop and MapReduce	C	Informatics Department	4,00	152	64		28	36A		
2	Monte Carlo and ML methods	C	Informatics Department	4,00	152	64			36	28A	
3	Applied statistics methods in python	C	Informatics Department	4,00	152	64	34	30A			
<b>Data Analysis in Finance</b>				<b>12,00</b>	<b>456</b>	<b>192</b>	<b>34</b>	<b>58</b>	<b>72</b>	<b>28</b>	
<b>Обязательные дисциплины специализации</b>				<b>12,00</b>	<b>456</b>	<b>192</b>	<b>34</b>	<b>58</b>	<b>72</b>	<b>28</b>	

1	Stochastic theory of finance	C	Informatics Department	4,00	152	64			36	28A	
2	Stochastic differential equations and statistics of random processes	C	Informatics Department	4,00	152	64		28	36A		
3	Theory of random processes in continuous time and fundamentals of stochastic analysis	C	Informatics Department	4,00	152	64	34	30A			
<b>Machine Learning Architecture</b>				<b>12,00</b>	<b>456</b>	<b>192</b>		<b>62</b>	<b>100</b>	<b>30</b>	
<b>Обязательные дисциплины специализации</b>				<b>12,00</b>	<b>456</b>	<b>192</b>		<b>62</b>	<b>100</b>	<b>30</b>	
1	Introduction to Hadoop and MapReduce	C	Informatics Department	4,00	152	64		28	36A		
2	Engineering Practices	C	Informatics Department	4,00	152	64		34	30A		
3	Programming languages (Kotlin and Scala, functional programming, Haskell)	C	Informatics Department	4,00	152	64			34	30A	
<b>Compulsory Courses</b>				<b>17,00</b>	<b>646</b>	<b>202</b>	<b>70</b>	<b>58</b>	<b>34</b>	<b>40</b>	
1	Network Data Analysis	C	Informatics Department	5,00	190	64	34	30A			
2	Research Seminar	C	Informatics Department	3,00	114	10				10A	
3	Deep Learning Basics	C	Informatics Department	5,00	190	64			34	30A	
4	Parallel programming on GPU (CUDA, OpenMP, numba)	C	Informatics Department	4,00	152	64	36	28A			
<b>Minor</b>				<b>10,00</b>	<b>380</b>	<b>120</b>	<b>28</b>	<b>32</b>	<b>32</b>	<b>28</b>	
1	Minor	C		10,00	380	120	28	32A	32	28A	
<b>English</b>						<b>2</b>			<b>2</b>		
<b>Examinations</b>						<b>2</b>			<b>2</b>		
1	Independent English Exam	C	School of Foreign Languages			2			2A		Foreign language
<b>Internship</b>				<b>8,00</b>	<b>304</b>	<b>4</b>				<b>4</b>	
<b>Project Internship</b>				<b>4,00</b>	<b>152</b>	<b>2</b>				<b>2</b>	
1	Project	C		4,00	152	2				2A	
<b>Professional Internship</b>				<b>4,00</b>	<b>152</b>	<b>2</b>				<b>2</b>	
1	Work Experience Internship	C		4,00	152	2				2A	

**Curriculum agreed:**

Academic Supervisor	MUKHIN M.S.	17.05.2024
Dean		17.05.2024
Deputy Director	KUZMIN P.V.	17.05.2024
Head of Centre for Educational Model Design	LEPESHKIN I.A.	23.05.2024

\* Subject type:

Compulsory course

C

Elective course  
Optional course

E  
O