☑ MSc Program: High Performance Computing

(education in English)

CURRICULUM 2026/2027

Courses	*ECTS-credits*	*Number of classes total*	*per week*
I semester			
HPC Architectures (E, GBT)	6	60	2+2+0
Basic Mathematical Methods and Algorithms (E, GBT)	6	60	2+2+0
Introduction to Statistics and Machine Learning with Applications in R (E, GBT)	5	45	2+0+1
Foundations of computing with Python (E, GBT)	6	75	2+2+1
Fundamentals of Artificial Intelligence and Data Science (E, GBT)	6	75	3+2+0
Computer and Network Security (E, GBT)	6	60	2+2+0
Virtualization and Cloud Computing (E, GICSSC)	5	60	2+0+2
II semester			
Operating Systems and Computer networks (E, GBT)	6	60	2+2+0
Advanced Computer architectures for HPC (E, GICSSC)	6	75	3+0+2
Programming practicum (E, GICSSC)	5	45	0+1+2
Parallel and Distributed Processing (E, GICSSC)	6	75	3+2+0
Parallel Programming with MPI (E, GICSSC)	5	60	2+0+2
Parallel Programming with Python (E, GBT)	6	75	2+2+1
Advanced mathematical methods and Algorithms (E, GNSSC)	5	60	2+2+0
Performance analysis and models (E, GNSSC)	5	60	2+2+0
Creating Technology-based ventures (E, GTC)	5	60	1+1+2
RRI, Open Data, IPR, Data protection and privacy (GDPR) (E, GTC)	5	60	2+1+0
III semester			
Computer Vision (E, GICSSC)	5	60	2+0+2
Applied Machine Learning (E, GICSSC)	7	75	3+0+2
Quantum algorithms and programming (E, GICSSC)	6	90	3+1+2
Knowledge Representation and Semantic Web Technologies (E, GICSSC)	5	60	2+2+0
Introduction to quantum technologies (E, GNSSC)	5	60	3+1+0
High Performance Computing for Weather and Climate (E, GNSSC)	5	60	2+2+0
Computational Biology (E, GNSSC)	5	75	3+0+2
Computational Physics (E, GNSSC)	5	60	2+0+2
Computational methods in Chemistry (E, GNSSC)	5	60	2+0+2
Scientific writing (E, GTC)	5	30	2+0+0
IV semester			
Quantum Computing (E, GNSSC)	7.5	60	3+1+0
Quantum simulations and quantum metrology (E, GNSSC)	5	60	3+1+0
Internship (C)	15		
Master Thesis (C)	15		

C – compulsory course
E – elective course

Elective courses

Selected courses must have minimum 90 Credits, as follows: 1-st semester - 30 credits; 2-nd semester – 30 credits; 3-rd semester - 30 credits, as follows:

* Profile 1 - Scientists from various domains aiming to acquire numerical and data analysis for science domains specialization
** Profile 2 - Computer science specialists aiming to acquire software system development, support and performance analysis specialization
Elective courses Group Basic Training **(E, GBT)**
For Profile 1* and Profile 2** selected courses must have minimum 30 Credits

Elective courses Group Informatics and Computer Sciences Specialization courses **(E, GICSSC)**
* For Profile 1 selected courses must have minimum 10 Credits
** For Profile 2 selected courses must have minimum 20 Credits

Elective courses Group Natural Sciences Specialization courses **(E, GNSSC)**
* For Profile 1 selected courses must have minimum 20 Credits
** For Profile 2 selected courses must have minimum 10 Credits

Elective courses Group Transversal courses **(E, GTC)**
For Profile 1* and Profile 2** selected courses must have minimum 10 Credits