

Master's Program in Computer Science: Course catalogue

CORE COURSES

Data Management Systems			credits
263-3010-00	Big Data	AS	10
252-0535-00	Advanced Machine Learning	AS	10
263-3855-00	Cloud Computing Architecture	SS	9

Machine Intelligence			credits
252-0535-00	Advanced Machine Learning	AS	10
263-3210-00	Deep Learning	AS	8
263-5210-00	Probabilistic Artificial Intelligence	AS	8
261-5110-00	Optimization for Data Science	SS	10
263-3710-00	Machine Perception	SS	8

Secure and Reliable Systems			credits
252-0237-00	Concepts of Object-Oriented Programming	AS	8
252-0463-00	Security Engineering	AS	7
252-1414-00	System Security	AS	7
263-2800-00	Design of Parallel and High-Performance Computing	AS	9
263-4640-00	Network Security	AS	8
263-2815-00	Automated Software Testing	SS	7
263-4660-00	Applied Cryptography	SS	8

Theoretical Computer Science			credits
252-0535-00	Advanced Machine Learning	AS	10
252-1425-00	Geometry: Combinatorics and Algorithms	AS	8
263-4500-00	Advanced Algorithms	AS	9
261-5110-00	Optimization for Data Science	SS	10
263-4400-00	Advanced Graph Algorithms and Optimization	SS	10
263-4508-00	Algorithmic Foundations of Data Science	SS	10

Visual and Interactive Computing			credits
252-0543-01	Computer Graphics	AS	8
263-5902-00	Computer Vision	AS	8
252-0538-00	Shape Modeling and Geometry Processing	SS	8
263-3710-00	Machine Perception	SS	8
263-5806-00	Digital Humans	SS	8

CORE ELECTIVES

Data Management Systems			credits
252-1414-00	System Security	AS	7
263-2800-00	Design of Parallel and High-Performance Computing	AS	9
263-3210-00	Deep Learning	AS	8
263-3850-00	Informal Methods	AS	5
263-3800-00	Advanced Operating Systems	SS	7
227-0558-00	Principles of Distributed Computing	SS	7

Machine Intelligence			credits
252-3005-00	Natural Language Processing	AS	7
263-2400-00	Reliable and Trustworthy Artificial Intelligence	AS	6
263-5056-00	Applications of Deep Learning on Graphs	AS	4

263-5300-00	Guarantees for Machine Learning	AS	7
263-5902-00	Computer Vision	AS	8
252-0526-00	Statistical Learning Theory	SS	8
252-0579-00	3D Vision	SS	5
261-5120-00	Machine Learning for Health Care	SS	5
263-5000-00	Computational Semantics for Natural Language Processing	SS	6
263-5051-00	AI Center Projects in Machine Learning	SS	4
263-5052-00	Interactive Machine Learning: Visualization & Explainability	SS	5
263-5255-00	Foundations of Reinforcement Learning	AS	7
263-5351-00	Machine Learning for Genomics	SS	5
263-5352-00	Advanced Formal Language Theory	SS	6
263-5353-00	Philosophy of Language and Computation I	SS	3
263-5354-00	Large Language Models	SS	8
227-0434-10	Mathematics of Information	SS	9
401-3632-00	Computational Statistics	SS	8

Secure and Reliable Systems			credits
252-1411-00	Security of Wireless Networks	AS	6
263-2400-00	Reliable and Trustworthy Artificial Intelligence	AS	6
263-2520-00	Formal Foundations of Programming Languages	AS	5
263-4657-00	Advanced Encryption Schemes	AS	5
263-4665-00	Zero-Knowledge Proofs	AS	5
227-0579-00	Hardware Security	AS	7
252-0408-00	Cryptographic Protocols	SS	6
263-2812-00	Program Verification	SS	5
263-4600-00	Formal Methods for Information Security	SS	5
263-4656-00	Digital Signatures	SS	5

Theoretical Computer Science			credits
227-0417-00	Information Theory I	AS	6
263-5300-00	Guarantees for Machine Learning	AS	7
401-3054-14	Probabilistic Methods in Combinatorics	AS	6
401-3055-64	Algebraic Methods in Combinatorics	AS	6
401-3901-00	Linear & Combinatorial Optimization	AS	11
402-0448-01	Quantum Information Processing I: Concepts	AS	5
252-0408-00	Cryptographic Protocols	SS	6
252-1424-00	Models of Computation	SS	6
263-4509-00	Complex Network Models	SS	5
263-4510-00	Introduction to Topological Data Analysis	SS	8
263-4656-00	Digital Signatures	SS	5
272-0300-00	Algorithmik für schwere Probleme	SS	5
272-0302-00	Approximations- und Online-Algorithmen	SS	5
401-3052-10	Graph Theory	SS	9
401-3902-21	Network & Integer Optimization: From Theory to Application	SS	5

Visual and Interactive Computing			credits
227-0560-00	Computer Vision and AI for Autonomous Cars	AS	6
252-0546-00	Physically-Based Simulation in Computer Graphics	AS	5
263-5905-00	Mixed Reality	AS	5
252-0312-00	Mobile Health and Activity Monitoring	SS	6
252-0579-00	3D Vision	SS	5
252-5706-00	Mathematical Foundations of Computer Graphics and Vision	SS	5
263-5052-00	Interactive Machine Learning: Visualization & Explainability	SS	5
263-5704-00	Artificial Intelligence for Digital Characters	SS	4