Doctoral program name

Theoretical Computer Science, Data Security and Cryptography

Program Manager

Dr. Vaszil György

Objectives of Doctoral Programme

PhD students are introduced to the foundations and practical applications of the models and methods used in computer science with special regard to the fields of theoretical computer science, data security and protection, and the didactics of informatics education. In addition, students must become familiar with the methodology of scientific data collection, systematization and publication, and they are expected to join the research work in the field of their chosen topic.

Academic and Research Fields

Computer Science

Standard and nonstandard logical systems, computability and algorithmic complexity, parallel processes and algorithms. Formal languages and automata theory, automata networks, unconvential automata and unconvential models of computation. Classical artificial intelligence algorithms, automatic deduction, logical programming. Theory and application of rough sets.

Data Protection and Cryptography

Design and analysis of cryptographic primitives, protocols and schemes. Solving complex cryptographic problems in areas such as IoT ecosystems, vehicular ad hoc networks, and blockchain technologies. Research on advanced protocols, identity management and authentication, and secure multi-party computation. Quantum- and post quantum-cryptography. Conducting security analyses using computational-security and process-calculus based tools.

Didactics of Informatics

IT education and IT-supported education. Support for research areas that help examine traditional and new approaches and models, as well as the efficiency of digital processes and products, and the development of scientific methods. Support for digital and sustainable transformation processes.

Members of the doctoral programme

Name	Academic degree	Topic poster	Instructor
Dr. Abari Kálmán	PhD	-	X
Dr. Battyányi Péter	PhD	X	X
Dr. Bertók Csanád	PhD	-	X
Dr. Biró Piroska	PhD	X	X
Dr. Bujdosó Gyöngyi	PhD habil.	X	X
Dr. Csernoch Mária	PhD habil.	X	X
Dr. Fazekas Attila	PhD habil.	-	X
Dr. Gilányi Attila László	PhD habil.	-	X
Dr. Hannusch Carolin	PhD	X	X
Dr. Herendi Tamás	PhD habil.	-	X
Dr. Horváth Géza	PhD habil.	X	X
Dr. Kádek Tamás	PhD	-	X
Dr. Kovásznai Gergely	PhD habil.	-	X
Dr. Kruppa András Tibor	DSc	X	X
Dr. Nagy Benedek	PhD habil.	X	X
Dr. Oláh Norbert	PhD	-	X
Dr. Papp Ildikó	PhD habil.	-	X
Dr. Pethő Attila	DSc MTA rt	-	X
Dr. Pintér-Huszti Andrea	PhD habil.	-	X
Dr. Szabó Hedvig	PhD	-	X
Dr. Szeghalmy Szilvia	PhD	-	X
Dr. Vaszil György	DSc	-	X
Dr. Zichar Marianna	PhD habil.	-	X

Subjects

	Subject name	Credit	Subject teacher
Compulsory elective subjects	Nonstandard Logics	2	Dr. Battyányi Péter
	Automata and Languages	2	Dr. Horváth Géza
	Unconventional Automata	2	Dr. Nagy Benedek
	Classical First-order Logic	2	Dr. Fazekas Attila
	Semantics of Programming Languages	2	Dr. Battyányi Péter
	Rough Set Theory	2	Dr. Kádek Tamás
	Biomolecular Computing	2	Dr. Vaszil György
	Cryptographic Protocols	2	Dr. Pintér-Huszti Andrea
	Finite Fields and Applications	2	Dr. Herendi Tamás
	Cryptographic Tools for IT Security	2	Dr. Kádek Tamás
	Information and Coding Theory	2	Dr. Pethő Attila
	Cryptographic Algorithms	2	Dr. Pethő Attila
	Number Theory	2	Dr. Bertók Csanád
	Blockchain Technology	2	Dr. Oláh Norbert
	Developing Computational Thinking Skills	2	Dr. Csernoch Mária
	Sprego - Programming in Spreadsheet Environment	2	Dr. Csernoch Mária
	Knowledge-Transfer Items in Teaching Informatics	2	Dr. Csernoch Mária
	Emerging Technologies in e-Learning: Platforms, Tools and Methods in e-Learning	2	Dr. Bujdosó Gyöngyi
	Qualitative and Quantitative Research Methods in Education	2	Dr. Biró Piroska
	Computer Graphics in Education	2	Dr. Papp Ildikó
	Theoretical Foundations of Virtual, Augmented and Mixed Reality	2	Dr. Gilányi Attila László
Elective subjects	Classical AI Algorithms	2	Dr. Kádek Tamás
	Quantum computers	2	Dr. Kruppa András Tibor
	Theory of Computability and Applications	2	Dr. Battyányi Péter
	Combinatorial and Algorithmic Properties of Formal Languages	2	Dr. Nagy Benedek
	Context-free and Context-sensitive Languages	2	Dr. Horváth Géza
	Automated Theorem Proving	2	Dr. Kádek Tamás
	The Theory and Implementation of SAT Solvers and Bit-Vector Logics	2	Dr. Kovásznai Gergely
	Introduction to Membrance Computing	2	Dr. Vaszil György
	Automata Networks	2	Dr. Horváth Géza
	Data-Level Approaches for Imbalanced Datasets	2	Dr. Szeghalmy Szilvia
	Organizational and Legal Aspects of Data Protection	2	Dr. Szabó Hedvig
	Computational Number Theoretical and Algebraic Program Packages	2	Dr. Hannusch Carolin
	Design and Analysis of Cryptographic Protocols	2	Dr. Pintér-Huszti Andrea
	Privacy Enhancing Technologies	2	Dr. Pintér-Huszti Andrea
	Virtual Reality for Supporting Knowledge Sharing	2	Dr. Bujdosó Gyöngyi
	Lean-oriented Digital Education	2	Dr. Csernoch Mária
	Knowledge Space Theory in Practice	2	Dr. Abari Kálmán
	Supporting Education with Digital Technologies	2	Dr. Biró Piroska
	Creative Problem Solving Based on Design Thinking	2	Dr. Zichar Marianna
	3D Modeling in Education	2	Dr. Papp Ildikó
	Applications of Virtual, Augmented and Mixed Reality	2	Dr. Gilányi Attila László