Doctoral program name

Theoretical foundations and applications of information technology, artificial intelligence and stochastic systems

Program Leader

Dr. István Fazekas

Objectives of Doctoral Programme

The participating students should learn about the theoretical foundations of information technology and stochastic systems, get an idea of the possible applications of the theory and develop appropriate research skills to enrich the theory. Among the topics to be covered, priority is given to those that increase the quality and intelligence of computer services, thus directly satisfying the needs of the information society.

Academic and Research Fields

Modeling of complex systems: stochastic and computer models including machine learning tools. Scientific computing: solving statistical, numerical analysis and operations research problems, their application in the fields of natural and social sciences (meteorology, economics, ...). Investigation of operations research methods, their scientific and industrial applications. Stochastic models for describing temporal and spatial processes. Investigation of stochastic financial, insurance and other econometric models using statistical and machine learning methods. Mathematical background and applications of machine learning. Statistical, mathematical and software tools of business intelligence. Mathematical and computer analysis of asymptotic properties of stochastic models. Modeling of network evolution using random graphs and computer experiments.

Library informatics, metadata management; Web applications, web archiving, virtual reality. Information theory and history; digital media theory, digital reading and learning narratives; digital libraries, electronic collections, repositories.

Members of the doctoral programme

Name	Academic degree	Topic poster	Instructor
Dr. Baran Ágnes Éva	PhD, habil.	x	x
Dr. Baran Sándor	DSc, habil.	x	x
Dr. Bogacsovics Gergő	PhD	-	x
Dr. Bujdosóné Dani Erzsébet	PhD, habil.	x	x
Dr. Eszenyiné Borbély Mária	PhD		x
Dr. Fazekas István	DsC, habil.	x	x
Dr. Gáll József Mihály	PhD	x	x
Dr. Gilányi Attila	PhD, habil.		x
Dr. Kálai Sándor	PhD, habil.		x
Dr. Németh Márton	PhD		x
Dr. Némethi-Takács Margit	PhD		x
Dr. Rácz Anett	PhD, habil.	x	x
Dr. Szokol Patrícia Ágnes	PhD, habil.		x
Dr. Tajti Tibor Gábor	PhD	x	x
Dr. Virág Ágnes	PhD	x	x
Dr. Virágos Márta	PhD	x	x

Subjects

	Subject name	Credit	Subject teacher
Compulsory elective subjects	Scientific computing techniques	2	Dr. Baran Ágnes Éva
	Stochastic models	2	Dr. Gáll József Mihály
	Statistical modeling	2	Dr. Fazekas István
	Multidimensional statistical analysis	2	Dr. Baran Sándor
	Chapters from the theory of stochastic processes	2	Dr. Baran Sándor
	Selected chapters from probability theory	2	Dr. Fazekas István
	Machine learning basics	2	Dr. Fazekas István
	Machine learning applications	2	Dr. Tajti Tibor Gábor
	Large language models and agent systems	2	Dr. Bujdosóné Dani Erzsébet
	Modeling and optimization	2	Dr. Bujdosóné Dani Erzsébet
	Digital reading narratives, reading theories, e-literature	2	Dr. Némethi-Takács Margit
	Information history	2	Dr. Németh Márton
	Metadata management and cataloging	2	Dr. Virágos Márta
	Web archiving	2	Dr. Baran Ágnes Éva
	Library management: scientific communication, digital libraries, digital repositories management	2	Dr. Gáll József Mihály
Elective subjects	Stochastic optimization	2	Dr. Baran Ágnes Éva
	Stochastic algorithms	2	Dr. Baran Sándor
	Optimization software and implementations	2	Dr. Rácz Anett
	Decision models	2	Dr. Rácz Anett
	Convergence of probability measures	2	Dr. Rácz Anett
	Financial mathematics	2	Dr. Fazekas István
	Insurance mathematics	2	Dr. Gáll József Mihály
	Computer statistics	2	Dr. Gáll József Mihály
	Advanced collaborative learning methods	2	Dr. Szokol Patrícia Ágnes
	Artificial intelligence in practice	2	Dr. Tajti Tibor Gábor
	Digital communication	2	Dr. Virág Ágnes
	Quality and knowledge management in a digital library environment	2	Dr. Eszenyiné Borbély Mária
	Digital media culture and media theory	2	Dr. Kálai Sándor
	Digital competences	2	Dr. Eszenyiné Borbély Mária
	Copyright in the digital world	2	Dr. Virágos Márta
	Virtual, augmented, mixed reality and their applications	2	Dr. Gilányi Attila