

1.	Field of study	Computer Science
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2021/2022 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time
7.	Academic year for which the revised course structure applies	—

Obligatory courses										year 1			year 2			
No.	Module	Lang.	E/C	form of teaching			Total ECTS	semester 1			semester 2			semester 3		
				Total	L	O		L	O	E	L	O	E	L	O	E
1	Algorithmics and Advanced Data Structures	PL	E	60	30	30	4	30	30	4						
2	Computer simulations	PL	E	60	30	30	4	30	30	4						
3	Modern programming languages	PL	E	60	30	30	4	30	30	4						
4	Statistical analysis in research	PL	Z	30	15	15	2	15	15	2						
5	Computer network technologies	PL	Z	45	15	30	3				15	30	3			
6	Concurrent programming	PL	Z	30	15	15	2				15	15	2			
7	Data mining	PL	E	60	30	30	4				30	30	4			
8	Managing IT projects and teams	PL	Z	30	10	20	2				10	20	2			
9	Monographic lecture - Combinatorial machine learning	EN	Z	30	30		2				30		2			
10	General academic module (Humanities)	-	Z	45		45	3							45	3	
11	General academic module (Social Sciences)	-	Z	30		30	2							30	2	
12	Intellectual property protection	PL	Z	15	15		2							15	2	
13	IT for the Blind and Visually Impaired	PL	Z	15	15		2							15	2	
14	Mathematical modeling of optimization problems	PL	Z	30	15	15	3							15	15	3
TOTAL Obligatory courses:				540	250	290	39	105	105	14	100	95	13	45	90	12

Diploma courses										year 1			year 2			
No.	Module	Lang.	E/C	form of teaching			Total ECTS	semester 1			semester 2			semester 3		
				Total	L	O		L	O	E	L	O	E	L	O	E
1	Diploma courses group I <i>*[see description below]</i>	*	*	135	45	90	12	45	90	12						
2	Introduction to scientific research.	PL	Z	2		2	1		2	1						
3	Master's seminar I	PL	Z	15		15	2		15	2						
4	Monographic lecture	PL	Z	20	20		1	20		1						
5	Diploma courses group II <i>*[see description below]</i>	*	*	135	45	90	12				45	90	12			
6	Master's seminar II	PL	Z	30		30	2				30	2				
7	Master's workshop	PL	Z	45		45	3				45	3				
8	Diploma courses group III <i>*[see description below]</i>	*	*	45	15	30	4							15	30	4
9	Master's seminar III	PL	Z	30		30	9							30	9	

10	Master's workshop	PL	Z	45		45	5								45	5				
				TOTAL Diploma courses:				502	125	377	51	65	107	16	45	165	17	15	105	18
				TOTAL:				1042	375	667	90	382	30	405	30	255	30			
TOTAL											1042									

The study ends with the awarding of a Master's Degree in the field of Computer Science.

* Groups of modules

Diploma courses group I

Description:					
The student selects three modules from the list. In the course of the whole education, no module can be repeated.					
Modules:	Lang.	E/C	L	O	ECTS
Administration of network services	PL	C	15	30	4
Advanced methods of data analysis	PL	C	15	30	4
Algorithmically generated graphics	PL	C	15	30	4
Artificial intelligence in computer graphics	PL	C	15	30	4
Biometric recognition and access control systems	PL	C	15	30	4
Cloud computing technologies	PL	C	15	30	4
cluster analysis algorithms in applications	PL	C	15	30	4
Computational Geometry	PL	C	15	30	4
Computational intelligence techniques	PL	C	15	30	4
Data analysis in business	PL	C	15	30	4
Data visualization	PL	C	15	30	4
Data warehouses	PL	C	15	30	4
Decision and association rules in knowledge data discovery	PL	C	15	30	4
Deep learning with neuralk networks	PL	C	15	30	4
Fractal Methods in Computer Graphics	PL	C	15	30	4
Fuzzy Sets nad Systems	PL	C	15	30	4
GPGPU computing	PL	C	15	30	4
Image and video processing techniques	PL	C	15	30	4
Image processing algorithms in biometrics and bioinformatics	PL	C	15	30	4
intelligent data processing	PL	C	15	30	4
Internet of Things technologies	PL	C	15	30	4
Internet protocols	PL	C	15	30	4
Introduction to data classificatin and clusterization in biometry	PL	C	15	30	4
Introduction to reverse engineering	PL	C	15	30	4
Machine learning in biometrics and bioinformatics	PL	C	15	30	4
Methods of group decision making	PL	C	15	30	4
Microcomputers and network couplers	PL	C	15	30	4
Mobile systems and applications	PL	C	15	30	4
Network Systems Security	PL	C	15	30	4
Object-relational database systems in biometry	PL	C	15	30	4
Outlier detection algorithms	PL	C	15	30	4
Procedural Content Generation	PL	C	15	30	4

Real-time Graphics	PL	C	15	30	4
Recommendation systems and social networks	PL	C	15	30	4
Script languages in data analysis	PL	C	15	30	4
Selected graph algorithms	PL	C	15	30	4
Systemy wspomagania decyzji	PL	C	15	30	4
Techniques for optimizing computer programs	PL	C	15	30	4
The concept of programming languages	PL	C	15	30	4
Web applications	PL	C	15	30	4
Wireless and sensor networks	PL	C	15	30	4

Diploma courses group II

Description:					
The student selects three modules from the list. In the course of the whole education, no module can be repeated.					
Modules:	Lang.	E/C	L	O	ECTS
Administration of network services	PL	C	15	30	4
Advanced methods of data analysis	PL	C	15	30	4
Algorithmically generated graphics	PL	C	15	30	4
Artificial intelligence in computer graphics	PL	C	15	30	4
Biometric recognition and access control systems	PL	C	15	30	4
Cloud computing technologies	PL	C	15	30	4
cluster analysis algorithms in applications	PL	C	15	30	4
Computational Geometry	PL	C	15	30	4
Computational intelligence techniques	PL	C	15	30	4
Data analysis in business	PL	C	15	30	4
Data visualization	PL	C	15	30	4
Data warehouses	PL	C	15	30	4
Decision and association rules in knowledge data discovery	PL	C	15	30	4
Deep learning with neuralk networks	PL	C	15	30	4
Fractal Methods in Computer Graphics	PL	C	15	30	4
Fuzzy Sets nad Systems	PL	C	15	30	4
GPGPU computing	PL	C	15	30	4
Image and video processing techniques	PL	C	15	30	4
Image processing algorithms in biometrics and bioinformatics	PL	C	15	30	4
intelligent data processing	PL	C	15	30	4
Internet of Things technologies	PL	C	15	30	4
Internet protocols	PL	C	15	30	4
Introduction to data classificatin and clusterization in biometry	PL	C	15	30	4
Introduction to reverse engineering	PL	C	15	30	4
Machine learning in biometrics and bioinformatics	PL	C	15	30	4
Methods of group decision making	PL	C	15	30	4
Microcomputers and network couplers	PL	C	15	30	4
Mobile systems and applications	PL	C	15	30	4
Network Systems Security	PL	C	15	30	4
Object-relational database systems in biometry	PL	C	15	30	4
Outlier detection algorithms	PL	C	15	30	4

Procedural Content Generation	PL	C	15	30	4
Real-time Graphics	PL	C	15	30	4
Recommendation systems and social networks	PL	C	15	30	4
Script languages in data analysis	PL	C	15	30	4
Selected graph algorithms	PL	C	15	30	4
Systemy wspomagania decyzji	PL	C	15	30	4
Techniques for optimizing computer programs	PL	C	15	30	4
The concept of programming languages	PL	C	15	30	4
Web applications	PL	C	15	30	4
Wireless and sensor networks	PL	C	15	30	4

Diploma courses group III

Description:					
The student selects one module from the list. In the course of the whole education, no module can be repeated.					
Modules:					
	Lang.	E/C	L	O	ECTS
Administration of network services	PL	C	15	30	4
Advanced methods of data analysis	PL	C	15	30	4
Algorithmically generated graphics	PL	C	15	30	4
Artificial intelligence in computer graphics	PL	C	15	30	4
Biometric recognition and access control systems	PL	C	15	30	4
Cloud computing technologies	PL	C	15	30	4
cluster analysis algorithms in applications	PL	C	15	30	4
Computational Geometry	PL	C	15	30	4
Computational intelligence techniques	PL	C	15	30	4
Data analysis in business	PL	C	15	30	4
Data visualization	PL	C	15	30	4
Data warehouses	PL	C	15	30	4
Decision and association rules in knowledge data discovery	PL	C	15	30	4
Deep learning with neuralk networks	PL	C	15	30	4
Fractal Methods in Computer Graphics	PL	C	15	30	4
Fuzzy Sets nad Systems	PL	C	15	30	4
GPGPU computing	PL	C	15	30	4
Image and video processing techniques	PL	C	15	30	4
Image processing algorithms in biometrics and bioinformatics	PL	C	15	30	4
intelligent data processing	PL	C	15	30	4
Internet of Things technologies	PL	C	15	30	4
Internet protocols	PL	C	15	30	4
Introduction to data classificatin and clusterization in biometry	PL	C	15	30	4
Introduction to reverse engineering	PL	C	15	30	4
Machine learning in biometrics and bioinformatics	PL	C	15	30	4
Methods of group decision making	PL	C	15	30	4
Microcomputers and network couplers	PL	C	15	30	4
Mobile systems and applications	PL	C	15	30	4
Network Systems Security	PL	C	15	30	4
Object-relational database systems in biometry	PL	C	15	30	4

Outlier detection algorithms	PL	C	15	30	4
Procedural Content Generation	PL	C	15	30	4
Real-time Graphics	PL	C	15	30	4
Recommendation systems and social networks	PL	C	15	30	4
Script languages in data analysis	PL	C	15	30	4
Selected graph algorithms	PL	C	15	30	4
Systemy wspomagania decyzji	PL	C	15	30	4
Techniques for optimizing computer programs	PL	C	15	30	4
The concept of programming languages	PL	C	15	30	4
Web applications	PL	C	15	30	4
Wireless and sensor networks	PL	C	15	30	4

Legend

Each semester consists of 15 weeks

E/C - examination/course work

E - ECTS

L - lecture, O - all forms of teaching excluding lecture (practical classes, laboratory classes, discussion classes, seminar, proseminar, language classes, field practice, workshop, internship, tutoring)