1.	**Field of study**	**Computer Science**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2019/2020 (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	2019/2020

Specialization: Computer Graphics and Visualization

Field of study courses

				form of teaching				year 1						year 2		
								semester 1			semester 2			semester 3		
No.	Module	Lang.	E/C	Total	L	O	Total ECTS	L	O	E	L	O	E	L	O	E
1	Advanced algorithm and data structures	EN	E	60	30	30	5	30	30	5						
2	Development and configuration of computer networks	EN	Z	45	15	30	4	15	30	4						
3	Monographic lecture	EN	Z	30	30		4	30		4						
4	Programming paradigms	EN	E	60	30	30	5	30	30	5						
5	Systems modelling and analysis	EN	Z	45	15	30	4	15	30	4						
6	Parallel computing	EN	Z	30	15	15	4				15	15	4			
7	Elements of Software Testing	EN	Z	30		30	4								30	4
	TOTAL Field of study courses:			**300**	**135**	**165**	**30**	**120**	**120**	**22**	**15**	**15**	**4**	**0**	**30**	**4**

Speciality subjects

				form of teaching				year 1						year 2		
								semester 1			semester 2			semester 3		
No.	Module	Lang.	E/C	Total	L	O	Total ECTS	L	O	E	L	O	E	L	O	E
1	Computational geometry	EN	Z	30	10	20	2				10	20	2			
2	Intelligent computer graphics	EN	E	45	15	30	3				15	30	3			
3	Monographic's lecture	EN	Z	30	30		2				30		2			
4	Non-photorealistic graphics	EN	Z	45	15	30	3				15	30	3			
5	Specialization project I	EN	Z	45		45	2					45	2			
6	Specialized systems of data visualization	EN	Z	30	10	20	2				10	20	2			
7	Video processing techniques	EN	E	45	15	30	3				15	30	3			
8	Development of 3D graphical engines	EN	Z	30	15	15	2							15	15	2
9	General-Purpose computing on Graphics Processing Units	EN	Z	45	15	30	3							15	30	3
10	Graphics in mobile devices	EN	Z	45	15	30	3							15	30	3
11	Specialization project II	EN	Z	30		30	2								30	2
	TOTAL Speciality subjects:			**420**	**140**	**280**	**27**	**0**	**0**	**0**	**95**	**175**	**17**	**45**	**105**	**10**

Other requirements

				form of teaching				year 1						year 2		
								semester 1			semester 2			semester 3		
No.	Module	Lang.	E/C	Total	L	O	Total ECTS	L	O	E	L	O	E	L	O	E
1	Industrial property protection	EN	Z	30	10	20	4	10	20	4						

Other requirements

No.	Module	Lang.	E/C	form of teaching: Total	L	O	Total ECTS	year 1 semester 1: L	O	E	year 1 semester 2: L	O	E	year 2 semester 3: L	O	E
2	Managing IT projects and teams	EN	Z	30	10	20	4	10	20	4						
3	Master's workshop I	EN	Z	30		30	5					30	5			
4	Master's seminar I	EN	Z	15		15	4					15	4			
5	Master's seminar II - preparation of master thesis	EN	Z	30		30	10								30	10
6	Master's workshop II	EN	Z	45		45	6								45	6
	TOTAL Other requirements:			**180**	**20**	**160**	**33**	**20**	**40**	**8**	**0**	**45**	**9**	**0**	**75**	**16**
	TOTAL:			**900**	**295**	**605**	**90**	**300**		**30**	**345**		**30**	**255**		**30**
	TOTAL							**900**								

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

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)

1.	**Field of study**	**Computer Science**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2019/2020 (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	2019/2020

Specialization: Intelligent Information Systems

Field of study courses

No.	Module	Lang.	E/C	form of teaching: Total	L	O	Total ECTS	year 1 / semester 1: L	O	E	year 1 / semester 2: L	O	E	year 2 / semester 3: L	O	E
1	Advanced algorithm and data structures	EN	E	60	30	30	5	30	30	5						
2	Development and configuration of computer networks	EN	Z	45	15	30	4	15	30	4						
3	Monographic lecture	EN	Z	30	30		4	30		4						
4	Programming paradigms	EN	E	60	30	30	5	30	30	5						
5	Systems modelling and analysis	EN	Z	45	15	30	4	15	30	4						
6	Parallel computing	EN	Z	30	15	15	4				15	15	4			
7	Elements of Software Testing	EN	Z	30		30	4								30	4
	TOTAL Field of study courses:			**300**	**135**	**165**	**30**	**120**	**120**	**22**	**15**	**15**	**4**	**0**	**30**	**4**

Speciality subjects

No.	Module	Lang.	E/C	form of teaching: Total	L	O	Total ECTS	year 1 / semester 1: L	O	E	year 1 / semester 2: L	O	E	year 2 / semester 3: L	O	E
1	Artificial intelligence algorithms	EN	E	30	10	20	2				10	20	2			
2	Data base programming	EN	Z	30	10	20	2				10	20	2			
3	Data mining	EN	Z	30	10	20	3				10	20	3			
4	Decision support systems	EN	Z	60	30	30	4				30	30	4			
5	Programming mobile devices	EN	E	45	15	30	3				15	30	3			
6	RAD programming environments	EN	Z	60	30	30	3				30	30	3			
7	Data analysis in business	EN	Z	30	10	20	2							10	20	2
8	Data warehouses	EN	Z	30	10	20	2							10	20	2
9	Development of web-based solutions	EN	Z	45		45	2								45	2
10	Intelligent Data-driven Systems	EN	Z	30		30	2								30	2
11	Security of information systems	EN	Z	30	10	20	2							10	20	2
	TOTAL Speciality subjects:			**420**	**135**	**285**	**27**	**0**	**0**	**0**	**105**	**150**	**17**	**30**	**135**	**10**

Other requirements

No.	Module	Lang.	E/C	form of teaching: Total	L	O	Total ECTS	year 1 / semester 1: L	O	E	year 1 / semester 2: L	O	E	year 2 / semester 3: L	O	E
1	Industrial property protection	EN	Z	30	10	20	4	10	20	4						

Other requirements

No.	Module	Lang.	E/C	form of teaching: Total	L	O	Total ECTS	year 1 semester 1: L	O	E	year 1 semester 2: L	O	E	year 2 semester 3: L	O	E
2	Managing IT projects and teams	EN	Z	30	10	20	4	10	20	4						
3	Master's workshop I	EN	Z	30		30	5					30	5			
4	Master's seminar I	EN	Z	15		15	4					15	4			
5	Master's seminar II - preparation of master thesis	EN	Z	30		30	10								30	10
6	Master's workshop II	EN	Z	45		45	6								45	6
	TOTAL Other requirements:			**180**	**20**	**160**	**33**	**20**	**40**	**8**	**0**	**45**	**9**	**0**	**75**	**16**
	TOTAL:			**900**	**290**	**610**	**90**	**300**		**30**	**330**		**30**	**270**		**30**
	TOTAL							**900**								

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

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)

1.	**Field of study**	**Computer Science**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2019/2020 (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	2019/2020

Specialization: Internet Engineering

Field of study courses

No.	Module	Lang.	E/C	form of teaching: Total	L	O	Total ECTS	year 1 / semester 1: L	O	E	year 1 / semester 2: L	O	E	year 2 / semester 3: L	O	E
1	Advanced algorithm and data structures	EN	E	60	30	30	5	30	30	5						
2	Development and configuration of computer networks	EN	Z	45	15	30	4	15	30	4						
3	Monographic lecture	EN	Z	30	30		4	30		4						
4	Programming paradigms	EN	E	60	30	30	5	30	30	5						
5	Systems modelling and analysis	EN	Z	45	15	30	4	15	30	4						
6	Parallel computing	EN	Z	30	15	15	4				15	15	4			
7	Elements of Software Testing	EN	Z	30		30	4								30	4
	TOTAL Field of study courses:			**300**	**135**	**165**	**30**	**120**	**120**	**22**	**15**	**15**	**4**	**0**	**30**	**4**

Speciality subjects

No.	Module	Lang.	E/C	form of teaching: Total	L	O	Total ECTS	year 1 / semester 1: L	O	E	year 1 / semester 2: L	O	E	year 2 / semester 3: L	O	E
1	Front-end and back-end applications security	EN	E	45	15	30	3				15	30	3			
2	Internet protocols	EN	Z	45	15	30	2				15	30	2			
3	Microcomputers and network couplers	EN	Z	45	15	30	3				15	30	3			
4	Modern mobile technologies	EN	E	45	15	30	3				15	30	3			
5	Parallel computing engineering	EN	Z	40	10	30	2				10	30	2			
6	Selected methods of data mining	EN	Z	40	10	30	2				10	30	2			
7	Services servers administration	EN	Z	30	10	20	2				10	20	2			
8	Activation of application on computing cluster	EN	Z	30		30	2								30	2
9	Configuration and administration of hybrid networks	EN	Z	30		30	3								30	3
10	Web applications	EN	Z	30	10	20	3							10	20	3
11	Wireless sensor networks	EN	Z	40	10	30	2							10	30	2
	TOTAL Speciality subjects:			**420**	**110**	**310**	**27**	**0**	**0**	**0**	**90**	**200**	**17**	**20**	**110**	**10**

Other requirements

No.	Module	Lang.	E/C	form of teaching: Total	L	O	Total ECTS	year 1 / semester 1: L	O	E	year 1 / semester 2: L	O	E	year 2 / semester 3: L	O	E
1	Industrial property protection	EN	Z	30	10	20	4	10	20	4						

Other requirements								year 1						year 2		
				form of teaching				semester 1			semester 2			semester 3		
No.	Module	Lang.	E/C	Total	L	O	Total ECTS	L	O	E	L	O	E	L	O	E
2	Managing IT projects and teams	EN	Z	30	10	20	4	10	20	4						
3	Master's workshop I	EN	Z	30		30	5					30	5			
4	Master's seminar I	EN	Z	15		15	4					15	4			
5	Master's seminar II - preparation of master thesis	EN	Z	30		30	10								30	10
6	Master's workshop II	EN	Z	45		45	6								45	6
	TOTAL Other requirements:			**180**	**20**	**160**	**33**	**20**	**40**	**8**	**0**	**45**	**9**	**0**	**75**	**16**
	TOTAL:			**900**	**265**	**635**	**90**	**300**		**30**	**365**		**30**	**235**		**30**
TOTAL								**900**								

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

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)

1.	**Field of study**	**Computer Science**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2019/2020 (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	2019/2020

Specialization: Software Quality Engineering

Field of study courses

				year 1									year 2		
				form of teaching				semester 1			semester 2			semester 3		
No.	Module	Lang.	E/C	Total	L	O	Total ECTS	L	O	E	L	O	E	L	O	E
1	Advanced algorithm and data structures	EN	E	60	30	30	5	30	30	5						
2	Development and configuration of computer networks	EN	Z	45	15	30	4	15	30	4						
3	Monographic lecture	EN	Z	30	30		4	30		4						
4	Programming paradigms	EN	E	60	30	30	5	30	30	5						
5	Systems modelling and analysis	EN	Z	45	15	30	4	15	30	4						
6	Parallel computing	EN	Z	30	15	15	4				15	15	4			
7	Elements of Software Testing	EN	Z	30		30	4								30	4
	TOTAL Field of study courses:			**300**	**135**	**165**	**30**	**120**	**120**	**22**	**15**	**15**	**4**	**0**	**30**	**4**

Speciality subjects

				year 1									year 2		
				form of teaching				semester 1			semester 2			semester 3		
No.	Module	Lang.	E/C	Total	L	O	Total ECTS	L	O	E	L	O	E	L	O	E
1	Advanced object disigning	EN	Z	30		30	2					30	2			
2	Automation in the process of software development	EN	Z	45	15	30	3				15	30	3			
3	Concurrent programming	EN	E	45	15	30	3				15	30	3			
4	Machine learning algorithms	EN	E	45	15	30	3				15	30	3			
5	Methods of computational intelligence	EN	E	45	15	30	3				15	30	3			
6	Optimization techniques	EN	E	45	15	30	3				15	30	3			
7	Advanced object oriented programming	EN	Z	45	15	30	2							15	30	2
8	Declarative languages	EN	Z	30	15	15	2							15	15	2
9	Programming with use of agile methodologies	EN	Z	30		30	2								30	2
10	Security of information systems	EN	Z	30		30	2								30	2
11	Team project	EN	Z	30		30	2								30	2
	TOTAL Speciality subjects:			**420**	**105**	**315**	**27**	**0**	**0**	**0**	**75**	**180**	**17**	**30**	**135**	**10**

Other requirements

				year 1									year 2		
				form of teaching				semester 1			semester 2			semester 3		
No.	Module	Lang.	E/C	Total	L	O	Total ECTS	L	O	E	L	O	E	L	O	E
1	Industrial property protection	EN	Z	30	10	20	4	10	20	4						

Other requirements

No.	Module	Lang.	E/C	form of teaching: Total	L	O	Total ECTS	year 1 semester 1: L	O	E	year 1 semester 2: L	O	E	year 2 semester 3: L	O	E
2	Managing IT projects and teams	EN	Z	30	10	20	4	10	20	4						
3	Master's workshop I	EN	Z	30		30	5					30	5			
4	Master's seminar I	EN	Z	15		15	4					15	4			
5	Master's seminar II - preparation of master thesis	EN	Z	30		30	10								30	10
6	Master's workshop II	EN	Z	45		45	6								45	6
	TOTAL Other requirements:			**180**	**20**	**160**	**33**	**20**	**40**	**8**	**0**	**45**	**9**	**0**	**75**	**16**
	TOTAL:			**900**	**260**	**640**	**90**	**300**		**30**	**330**		**30**	**270**		**30**
	TOTAL							**900**								

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

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)