Doctor of Philospohy (Ph.D.) in Computer Sciences and Engineering					
Course group	**ECTS total**	**Course code**	**Course name**	**Course type**	**ECTS**
Breadth area 1: Theory and Algorithms		CS602	Cryptography and Network Security	elective	6
		CS603	Advanced Machine Learning	elective	6
		CS606	Advanced Algorithms	elective	6
		CS612	Nonlinear System Identification	elective	6
		CS613	Computational Techniques for Genomics	elective	6
		CS614	Algorithms	elective	6
Breadth area 2: Architecture, Systems, and Software		CS615	Compilers	elective	6
		CS616	Advanced Topics in Operating Systems	elective	6
		CS617	Advanced Topics in Software Engineering	elective	6
		CS618	Advanced Topics in Parallel Computing	elective	6
		CS619	Advanced Topics in Database Systems	elective	6
		CS620	Advanced Topics in Computer Architecture	elective	6
		CS621	Advanced Topics in Computer Networks	elective	6
Breadth area 3: Applications		CS601	Advanced Computer Vision	elective	6
		CS604	Data Mining	elective	6
		CS605	Wavelet and Applications	elective	6
		CS607	Fuzzy Logic with Applications	elective	6
		CS608	Social and Information Network Analysis	elective	6
		CS609	Neural Networks	elective	6
		CS610	Scientists	elective	6
		CS611	Support Vector Machines	elective	6
		CS622	Advanced Methods in Artificial Intelligence	elective	6
		CS623	Advanced Pattern Recognition	elective	6
		CS624	Intelligent Robotics Systems	elective	6
		CS625	Information Retrieval and Web Search	elective	6
		CS626	Advanced Computer Graphics	elective	6
		CS627	Multimedia Software Systems	elective	6
		CS628	Advanced Social Network Analysis	elective	6
		CS629	Advanced Computer and Network Security	elective	6
		CS630	Advanced Topics in Internet Programming	elective	6
		CS631	Bioinformatics for Microbiome	elective	6
General course		CS 600	Research	elective	6
PhD Thesis		CS790	PhD Thesis	required	120

Graduate Studies: summary of conditions for successful completion of studies				
Category	ECTS	Note:		
Courses	48	PhD candidates must earn 180 ECTS points in the following way: 1. complete courses that have a minimum 48 ECTS credits in total 2. scientific activities that have a minimum 12 ECTS credits, and 3. defence of the PhD thesis, which totals 120 ECTS credits. Students of the PhD program are required to complete 48 ECTS credits of coursework. At most 12 ECTS coursework credits (corresponding to 2 courses) can be applied from master level CSE courses, with previous approval decision of the program coordinator, provided that the student in question did not take those courses at the master level. Students are also allowed to apply 6 ECTS (1 course) from other related PhD programs, with the approval decision of the program coordinator. The student must complete at least one course in each of 3 different breadth areas: • Breadth area 1: Theory and Algorithms • Breadth area 2: Architecture, Systems, and Software • Breadth area 3: Applications Scientific activities • 12 ECTS credits intended for the scientific activities can be obtained by any of the following means: • 6 ECTS – scientific paper published in the IEEE/ACM conference proceedings • 12 ECTS – scientific paper published/accepted in the journal listed in the Science Citation Index Expanded database In above mentioned scientific papers, the student must be counted as the first author. PhD thesis Before scheduling the defence of the PhD thesis, third cycle students are obliged to publish (or at least have their paper accepted) their main findings from a doctoral dissertation in a journal listed in the Science Citation Index Expanded database or in the IEEE/ACM conference proceedings where the rate of acceptance of papers in the last two years (the last two conferences) was below 35%. Detailed procedures for writing and defence of the thesis are proscribed in Study Rules of the Third Study Cycle at IUS.		
Scientific Activity (Research Seminar)	12			
PhD thesis	120			
Total	180			