COURSE UNIT DESCRIPTION

Course unit title	Course unit code
Master Thesis	MADA7114

Lecturer	Department where the course unit is delivered
Coordinator: Algimantas Juozapavičius	Department of Computer Science II Faculty of Mathematics and Informatics Vilnius University

Cycle	Type of the course unit
Second	Compulsory

Mode of delivery	Semester or period when the course unit is delivered	Languages of instruction
Individual work followed by consultations	3th semester	Lithuanian and English

Prerequisites
None

Number of ECTS credits allocated	Student's workload	Contact hours	Individual work
30	800	12	788

Purpose of the course unit: programme competences to be developed

Generic competences to be developed

- Ability to work and study autonomously *(MB1)*
- Ability for abstract thinking being critical and self-critical, ability to analyze, process, and evaluate information *(MB2)*
- Ability to communicate professionally *(MB3)*
- Ability to manage and plan tasks *(MB4)*
- Ability to identify and resolve problems *(MB5)*

Subject-specific competences to be developed

- Ability to distinguish data management and analysis principles and ability to use them at advanced level *(MD1)*
- Ability to design, build, and specify IT services/systems having chosen the suitable infrastructure *(MD2)*
- Ability to apply technologies in practice and ability to evaluate technologies, their evolution, and trends *(MD3)*
- Ability to combine rules of model and program management *(MD8)*

Learning outcomes of the course unit	Teaching and learning methods	Assessment methods
Ability to list and identify the scientific, applied and computer science modeling problems for a various areas of human activities, identify problems, report and present possible and chosen solutions based on the theoretical basis	Study of the professional literature, discussions with the advisor of the master thesis, presentation to the advisor and a group of students, preparation of the report.	Written report. Exam (presentation on the report).
Ability to structure and design the process of scientific or applied problems and software for a various areas of human activities		
Ability to structure and design the numerical approach and computation modeling for a various areas of human activities and IT applications/services (virtual as well)		
Ability to define and design the suitable and/or grid and cloud		

computing infrastructure for scientific, applied, and other areas of human activities		

Course content: breakdown of the topics	Individual work: time and assignments							
	Lectures	Consultations	Seminars	Laboratory work	Internship/work placement	**Contact hours**	**Individual work**	**Assignments**
1. The final analysis and finalize the theoretical basis for the topic of research work, as chosen in Scientific Research I and in Scientific Research Project							**100**	Studies of literature (textbooks, related work and other references). The students have to prepare 2-8 pages of report for each topic, those will be included in the report in the final stage. At the end of the semester the preparation and giving of the presentation. Parts: the topic of research work, its theoretical basis, used or created models or systems, and algorithms or methodologies.
2. The final theoretical exploration and description of models/systems, as well as algorithms and methodologies for the topic of research work		2				**2**	**50**	
3. The experimental realization of the chosen and approved model / system / methodology / algorithm for the topic of research work							**150**	
4. The description and analysis of theoretical and experimental results achieved while doing research on the topic of research work		2				**2**	**80**	
5. The comparison of theoretical and experimental results achieved while working of research work with the ones in the literature, their analysis and evaluation		4				**4**	**120**	
6. The presentation of findings and conclusion for the thesis as well as the guidelines for a future research work		4				**4**	**100**	
7. Preparation for an final reporting and for the presentation of the results to the Commission, the presentation of these results							**188**	
Total		**12**				**12**	**788**	

Assessment strategy	Weight %	Deadline	Assessment criteria
Exam	100 %	June	The written report must be delivered before the strict deadline. During the exam the student reports on the work and makes a presentation which includes the topic of the research, its theoretical basis, algorithms and methodologies, their experimental realization, theoretical and practical results, their comparison with the results described in literature, conclusions, and future work. Presentation is delivered in oral, it continues 10 minutes, and the slides are used to present the material. The evaluation is given by advisor (25%), reviewer (25%), and by the committee (another 50%). The assessment criteria are correspondence (of the report and of the presentation) to the requirements for the scientific research work, general requirements, ability to answer questions. Also, the fluency and the organization of the presentation are considered.

Author	Publishing year	Title	Issue No or volume	Publishing house or Internet site
Required reading				
Jan Kleiberg, Eva Tardos	2006	Algorithm Design		Pearson Education Ltd.
David A. Forsyth, Jean Ponce	2003	Computer Vision, a modern approach		Prentice Hall
John C. Russ	1998	The Image Processing Handbook		CRC Press
Ian H. Witten, Alistair Moffat, Timothy G. Bell	1996	Managing Gigabytes		Van Nostrand Publishing
Algimantas Juozapavičius	2012	Scientific Research I/II. Study Guide		
Optional reading				
Anany Levitin	2003	Introduction to the Design of Algorithm		Pearson Education Ltd.
Bernd Jaehne, Horst Haussecker	2000	Computer Vision and Applications. Guide for students and practitioners		Academic Press
Richard G. Lyons	2011	Understanding Digital Signal Processing (3rd Edition)		Prentice Hall