COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
Multidimensional Data Visualization	

Lecturer(s)	Department(s) where the course unit (module) is delivered
Coordinator: prof. Julius Žilinskas **Other(s):**	Computer Science II

Study cycle	Type of the course unit (module)
Second	Optional

Mode of delivery	Period when the course unit (module) is delivered	Language(s) of instruction
Face-to-face	Second (spring) semester	English

Requirements for students	
Prerequisites:	**Additional requirements (if any):**

Course (module) volume in credits	Total student's workload	Contact hours	Self-study hours
5	125	42	83

Purpose of the course unit (module): programme competences to be developed		
Learning outcomes of the course unit (module)	**Teaching and learning methods**	**Assessment methods**
Ability to formulate aims for problems of multidimensional data visualization.	Lectures, solution of exercises during laboratory works and individually.	Exam, assessment of laboratory works.
Ability to assess suitability of multidimensional data visualization methods for analyzed data.	Lectures, analysis of methods and problems during lectures, solution of exercises during laboratory works and individually.	Exam, assessment of laboratory works.
Ability to present graphically results of multidimensional data visualization, comment and summarize them.	Analysis of methods and problems, solution of exercises during laboratory works and individually, interpretation of results.	Exam, assessment of laboratory works.

Content: breakdown of the topics	Contact hours							Self-study work: time and assignments	
	Lectures	Tutorials	Seminars	Exercises	Laboratory work	Internship/work placement	**Contact hours**	**Self-study hours**	**Assignments**

1. Multidimensional data and application of their visualization	2				7		**9**	**18**	Analysis of literature, laboratory works, preparation of report.
2. Direct visualization methods	2				7		**9**	**18**	Analysis of visualization software, laboratory works, preparation of report.
3. Linear projection methods	2				7		**9**	**18**	Analysis of visualization software, laboratory works, preparation of report.
4. Nonlinear projection methods	2						**2**		
5. Multidimensional scaling	2				7		**9**	**18**	Analysis of visualization software, laboratory works, preparation of report.
6. Optimization algorithms for multidimensional scaling	2						**2**		
7. Three-dimensional visualization of multidimensional data	2						**2**		
8. Preparation for exam								**11**	Preparation for exam
Total	**14**				**28**		**42**	**83**	

Assessment strategy	**Weight,%**	**Deadline**	**Assessment criteria**
Assessment of laboratory works	50	During semester	Exercises have the same weight and the average assessment is calculated at the end of semester.
Exam	50	During exam period	Correctness of answers

Author	**Year of publication**	**Title**	**Issue of a periodical or volume of a publication**	**Publishing place and house or web link**
Compulsary reading				
G. Dzemyda, O. Kurasova, J. Žilinskas	2013	Multidimensional Data Visualization. Methods and Applications		Springer, New York
J. Žilinskas	2017	Multidimensional Data Visualization		Web page of the course
Optional reading				
G. Dzemyda, O. Kurasova, J. Žilinskas	2008	Daugiamačių duomenų vizualizavimo metodai. Vadovėlis informatikos krypties doktorantams ir magistrantams		Mokslo Aidai, Vilnius
C. Chen, W. Hardle, A. Unwin	2008	Handbook of Data Visualization		Springer
C.D. Hansen, C.R. Johnson	2005	The Visualization Handbook		Elsevier