Subject code	Credits
INF5019	6

Course title in Lithuanian

DUOMENŲ VIZUALIZAVIMAS

Course title in English

DATA VISUALIZATION

Short course annotation in Lithuanian (up to 500 characters)

Tikslas – supažindinti su informacijos bei mokslinių duomenų vizualizavimu: pagrindinėmis sąvokomis, vizualizavimo raida, pagrindiniais grafinio dizaino principais, duomenų tipais ir duomenų apdorojimo/paruošimo vizualizacijai metodikomis, grafikų tipais ir jų taikymo atvejais, daugiamačių duomenų vizualizavimo metodais, jų taikymais ir juos realizuojančiais įrankiais. Studentai gebės parinkti tinkamus vizualizavimo metodus ir algoritmus įvairių tipų duomenims ar informacijai vizualizuoti bei gebės panaudoti vizualizavimo įrankius vizualizavimo uždaviniams spręsti.

Short course annotation in English (up to 500 characters)

The aim of this course is to provide the student the theoretical and practical basis of data and information visualization techniques. Students will get acquainted with basic properties of data. Moreover, students will learn different data visualization methods for simple and multidimensional (big) data, starting from simple line, bar, box and other plots, and moving to trees, graphs and projection techniques, such as PCA, MDS, SOM and other. Students will be able to choose the appropriate visualization methods and algorithms for any type of data or information, and independently implement the visualization task using different tools

Prerequisites for entering the course

Basic knowledge of mathematics

Course aim

Provide the student with the theoretical and practical knowledge of data visualization methods and techniques.

Links between study programme outcomes, course outcomes and criteria of learning achievement evaluation, study methods and methods of learning achievement

Course outcomes	Criteria of learning achievement evaluation	Study methods	Methods of learning achievement assessment
1. Knowledge and understanding of different data types and preprocessing	Identify data types and apply appropriate data preprocessing methods	Lectures, practical works, individual work,	Practical work and its presentation Mid-term exam Exam
2. Knowledge and understanding of basic data visualization techniques	Using basic data visualization techniques on selected data sets to answer selected questions	Lectures, practical works, individual work,	Practical work and its presentation Mid-term exam Exam
3. Knowledge and understanding of multidimensional data visualization techniques	Using multidimensional data visualization techniques on selected data sets to answer selected questions	Lectures, practical works, individual work,	Practical work and its presentation Mid-term exam Exam
4. Choosing and applying a proper visualization technique	Choosing and using data visualization methods to pose and answer questions for selected data sets.	Lectures, practical works, individual work	Practical work and its presentation Mid-term exam Exam
5. Presenting results	Formulate problems for selected data set, choose and apply selected data techniques (and explain, why these techniques were chosen), present solution (report, presentation)	Individual work and studies, discussions, consultations	Practical work and its presentation Mid-term exam Exam

Links between study programme outcomes and course outcomes

Study programme outcomes	Running number of course outcome				
	1	2	3	4	5
5. Develop mathematical models integrating the knowledge from various fields and different mathematical modelling techniques, and analyse the modelling results assessing the model adequacy and accuracy	+	+	+	+	
7. Analyse, understand and use mathematical methods		+	+	+	
11. Convey mathematical information to specialists of different fields orally and/or in written form, critically evaluate it			+	+	+
13. Take moral responsibility for the results of work					+

Content

No	Content (topics)
1.	History of visualization techniques, examples of visualization
2.	Data types.
3.	Simple visualization techniques and graphical design
4.	Multidimensional data visualization: direct techniques, projections, SOM, real-life examples
5.	Textual information visualization
6.	Maps and 3D visualization
7.	Volume visualization.

Study (teaching and learning) methods

Lectures and laboratory works, problem solving or case studies, group projects, oral presentation

Methods of learning achievement assessment

Criterion-referenced tests, observations of student works and interviews

Distribution of workload for students (contact and independent work hours)

Lectures	45 hours
Laboratory work	15 hours
Individual students work	100 hours
Total:	160 hours

Structure of cumulative score and value of its constituent parts

Final written exam (50%), mid-term written exam (17%), and assessments of laboratory (practical) work (33%).

Recommended reference materials

No.	Publication year	Authors of publication and title	Publishing house	Number of copies in		
				University library	*Self-study rooms*	*Other libraries*
Basic materials						
1.	2008	C. Chen, W.Hardle, A. Unwin. Handbook of Data Visualization.	Springer-Verlag		1	1
2.	2001	R. E. Tufte. The Visual Display of Quantitative Information	Graphics Press		1	
3.	2008	G. Dzemyda, O. Kurasova, J. Žilinskas. Daugiamačių duomenų vizualizavimo metodai	MII	http://web.vu.lt/mii/j.zilinskas/DzemydaKurasovaZilinskasDDVM.pdf		
Supplementary materials						
1.		M. Friendly. D.J. Denis. Milestones in the history of thematic cartography, statististical graphics and data visualization.		1		

2.		Selection of blogs and other Internet sources on the data visualization (such, as junkcharts (http://junkcharts.typepad.com/))		Electronic

Course programme designed by

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