Subject code	Credits
INF3003	6

Course title in Lithuanian

MATEMATINIS PROGRAMAVIMAS

Course title in English

MATHEMATICAL PROGRAMMING

Short course annotation in Lithuanian (up to 500 characters)

Kurso tikslas supažindinti studentus su optimizavimo teorija ir pagrindiniais algoritmais. Studentai mokomi formuluoti praktinius optimizavimo uždavinius matematiškai, parinkti efektyvų algoritmą jiems spręsti, interpretuoti optimizavimo rezultatus. Praktinių užsiėmimų metu supažindinama su optimizavimo programine įranga.

Short course annotation in English (up to 500 characters)

The objectives of the course are: acquisition of knowledge on optimization theory and main algorithms; development of skills in application of optimization methods to practical problems; training in applications of optimization software. The theoretical studies and practical training enables a student to formulate practical optimization problems mathematically; resolve trade off between adequacy and complexity of a chosen model; choose an efficient algorithm to solve a mathematically formulated practical problem; interpret optimization results; resolve pitfalls in process of solution of complicated problems; advice on optimization methods and software.

Prerequisites for entering the course

Discrete structures; Introduction to calculus and linear algebra; Programming Fundamentals.

Course aim

Provide knowledge on optimization theory and main algorithms and develop abilities to apply widely available optimization software.

Content

No	Content (topics)
1.	Classification of optimization problems.
2.	Convex sets and functions. Gradients and their properties.
3.	One dimensional optimization.
4.	Gradient descent.
5.	Newton method.
6.	Direct search methods.
7.	Optimality conditions for constrained problems.
8.	Penalty and barrier methods.
9.	Lagrange functions' methods.
10.	Linear programming: forms and geometric interpretation.
11.	Basis and pivoting.
12.	Simplex algorithm.
13.	Multicriteria optimization.
14.	Global optimization.
15.	Generalizations and extensions.

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

Lectures	**45 hours**
Laboratory work	**30 hours**
Individual students work	**85 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.	2000	A. Žilinskas, Matematinis programavimas.	VDU	46		
2.	2007	G. Dzemyda, V. Šaltenis, V. Tiešis, Optimizavimo metodai.	MII	16		

Supplementary materials				
1	2007	S. Kalanta, Taikomosios optimizacijos pagrindai.	Technika	5
2.	2008	A. Zhigljavsky, and A. Žilinskas, Stohastic Global Optimization.	Springer	1

Course programme designed by

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