

Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering				Institute of Mechatronics and Vehicle Engineering			
Subject title and code: Optimization Methods BMWOPE3MNF				Credits: 4			
Full-time study 2026-27 ac. 1 semester year							
The course is available at: mechatronical engineering MSc							
Supervised by: Dr. Frigyk Béla András		Instructors: Dr. Frigyk Béla András					
Prerequisite (neptun code): Applied Mathematics (BTXAME1MNF)							
Weekly number of lessons							
Lecture: 2	Group seminar: 1		Lab:		Consultation:		
Way of assessment: Midterm (Written and oral) mark							
Online consultation (in case it's required): ... (BBB link)							
Edu. goal: Essentially all engineering problems involve some kind of optimization at some point. The aim of this course is to introduce a couple of common optimization methods: The continuous methods can often help to understand the problem better. While the discrete methods almost always provide us with a practical, albeit sometimes only suboptimal, solution.							
Schedule							
Education week	Topics						
1.	Local extremum (minimum or maximum). Finding local extremum of functions of one or two variables.						
2.	Finding local extremum of function of more than two variables. Convexity and basics of convex optimization.						
3.	Conditional optimization. Method of Lagrange multipliers.						
4.	Application of method of Lagrange multipliers. Gradient method.						
5.	Linear inequalities. Linear programming: Graphical solution.						
6.	Linear programming, simplex method.						
7.	Integer programming. Branch-and-bound method.						
8.	1st Midterm						
9.	Basics graph theory. Graph algorithms.						
10.	Optimal paths. Dijkstra algorithm. Bellman-Ford method.						
11.	Maximal matching in bipartite graphs. Hungarian method.						
12.	Rector's holiday						
13.	2nd Midterm						
14.	Retake/Make-up midterm						
Mid-semester requirements							
Test		Assignment to be submitted		Szöveg beírásához kattintson vagy koppintson ide.			
amount	dates	amount	deadlines	amount	dates		
2	8,13						
According to the HKR attendance of group seminars and lab exercises are mandatory.							
Other requirements for participation in sessions not covered by the regulations and restrictions on substitutions:							
Test		Assignment to be submitted		Szöveg beírásához kattintson vagy koppintson ide.			
maximum points available	minimum score required to pass /test	maximum points available	minimum score required to pass / assignment	maximum points available	minimum score required to pass /lab		
100 points	50 points	...points	...points	...points	...points		

Total number of points achievable in semester: 100 points				
Grading thresholds	satisfactory 50 % and above	average 63 % and above	good 76 % and above	excellent 90 % and above
Other evaluation criteria:				
Receive a signature If you fail to take both midterms. denied entry:				
Required references:				
Recommended references: - Thomas' Calculus, Pearson, 2018 - Ronald L. Rardin, Optimization in Operations Research, Pearson, 2015				
Quality assurance methods of the subject:				

Things, that are not included, can be found within the regulations of Óbuda University.