

Study program: Engineering Management			
Type and level of studies: Undergraduate studies			
Course title: Quantitative methods			
Name of lecturer/lecturers: Damljanović Ž. Nada			
Language of instruction: English			
ETCS: 5			
Prerequisites: -			
Semester: Winter			
Course unit objective			
Enabling students to develop abstract thinking and to master modern mathematical models and methods as a useful tool for solving practical management tasks in industry.			
Learning outcomes of Course unit			
At the end of the course, students would learn how to model and solve diverse optimization problems with special emphasis on those that are of theoretical and practical interest for managers, and they would be trained for planning, modelling and solving various structured management activities and practical tasks using appropriate software support.			
Course unit contents			
<i>Theoretical classes</i>			
Introduction to quantitative techniques, mathematical modelling of business, production and service systems, typical tasks of planning and scheduling, planning experiments in research, prognosis, time series, factor analysis, basic models of factor analysis, nonlinear programming methods, methods of permissible routes, methods of external penalty functions, methods of internal penalty functions, dynamic programming and some applications, principle of optimality, recurrent relations, mass service, introduction to the theory of multi-channel servicing, single-serving systems, combinatorial optimization and application, heuristic programming, computational complexity of problems and algorithms, special and general heuristics, travelling salesman problem, heuristics for solving the travelling salesman problem, graph colouring problem and applications, fuzzy sets, fuzzy logic, fuzzy approach to solving problems.			
<i>Practical classes</i>			
Solving concrete problems, examples and exercises based on exposed theoretical concepts and principles.			
Literature			
[1] C. G. Cassandras, S. Lafortune, Introduction to Discrete Event Systems, Springer, 2008.			
[2] P. Butkovič, Max-linear Systems: Theory and Algorithms, Springer, 2010.			
[3] R. E. Burkad, R. A. Cuninghame-Green, U. Zimmermann, Algebraic and Combinatorial Methods in Operational Research, Elsevier Science Publisher B. V., 1984.			
[4] D. G. Luenberger, Y. Ye, Linear and nonlinear programming, Springer, 2008.			
Number of active teaching hours			Other classes
Lectures: 2	Practice: 2	Other forms of classes:	
Teaching methods			
The lectures are performed using classical methods of teaching in combination with video projector and active interaction with students. Knowledge of students is tested by homework, colloquium, and final exam (written and oral). At the final, a comprehensive understanding of the exposed material is checked.			
Examination methods (maximum 100 points)			
Exam prerequisites:	No. of points:	Final exam:	No. of points:
Student's activity during lectures	6	oral examination	25
Practical classes/tests	30	written examination	35
Seminars/homework	4	
Project			
Other			
Grading system			
Grade	No. of points	Description	
10	91-100	Excellent	
9	81-90	Exceptionally good	
8	71-80	Very good	
7	61-70	Good	
6	51-60	Passing	
5	Less than 50	Failing	