

Table 5.2. Course Specification

Study Program: Master Academic Studies – Business Economics and Entrepreneurship			
Course Title: Operations Research			
Teacher(s): Sarić B. Branko			
Course Status: elective, first year, second semester			
ECTS Credits: 7			
Prerequisite: none			
Course Objective The aim of the course is to provide students with knowledge related to the characteristics of certain economic problems, the mathematical models that can be used to represent these problems, and the mathematical methods that can be used to find their optimal solutions. Students are trained to use software for modeling real problems and thus arrive at solutions more quickly, more easily simulate different conditions, and monitor their impact on the solution.			
Learning Outcome Having mastered the content of this course, the student will be able, for a large number of economic problems, knowing their characteristics, to define and collect the necessary data, form a suitable mathematical model, on the basis of which, using the appropriate method, he will find the optimal solution with the application of software for their solution.			
Course Content Theoretical Instruction Subject and goal of applied operations research; New directions of development and application; Linear programming (LP): Geometric interpretation of LP. (general form of LP problem, standard form); Canonical form of LP Application to resource allocation problems, production management, budget planning in the function of minimizing or maximizing a given goal. Simplex method and its geometric and algebraic interpretation. Possible outcomes of the simplex method (concept of simplex algorithm, numerical complexity of the simplex method); Dual problem of LP and rules of its formation (weak and strong duality, shadow prices); Transport problem (TP) (open and closed TP, potential method); Case studies in the field of transport, logistics and scheduling of workers for certain tasks. Game theory; Network planning (analysis of structure, time and costs of project implementation); Inventory models (deterministic and stochastic); Optimization of production planning and management; Modeling of waiting lines. Practical Instruction Analysis of the application of theoretically developed methods and models, formation of models and procedures for solving specific economic problems, sensitivity analysis of the optimal solution (exercises, other forms of teaching, study research work). Modeling of real problems.			
Literature 1. Hillier, Frederick S.,Lieberman, Gerald J., Introduction to operations research, New York : McGraw-Hill Education, 2015. 2. San Cristobal Mateo, Jose Ramon , Management science, operations research and project management, Surrey ; Burlington : Gower, 2015			
Number of hours of active teaching	Theoretical Instruction: 30		Practical Instruction: 45
Teaching Methods According to the above structure of the course, teaching is carried out through lectures accompanied by slides and exercises using modern teaching aids. Lectures are held in an auditorium with all students. The lectures will explain the methodology and concepts by area using examples from practice through discussion with students. Exercises are carried out by groups of students in the classrooms, as follows: auditorium, where individual topics from the lecture are further developed; laboratory for creating tasks with computer support. Exercises will be focused on examples and tasks that clarify areas from the lecture, through discussion and independent presentation by students. The creation of seminar papers will enable students to study the selected areas in more detail.			
Knowledge score (maximum number of points 100)			
Pre-exam Requirements	point	Final Exam	point
Activity during lectures	10	Written exam	40
Practical instruction		oral exam	
Midterm tests	30		
Seminar paper(s)	20		