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| **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty** | Faculty of Mechanical Engineering |
| **GENERAL INFORMATION** |
| Study Program | **Traffic engineering, transport and logistics** |
| Study Module (if applicable) | - |
| Course Title | Operations research |
| Level of Study | ☐Bachelor | ☒ Master’s | ☐ Doctoral |
| Type of Course | ☒ Obligatory | ☐ Elective |
| Semester | ☒ Autumn | ☐ Spring |
| Year of Study | I |
| Number of ECTS Allocated | 7 |
| Name of Lecturer/Lecturers | Predrag M. Rajković, Goran S. Petrović |
| Teaching Mode | ☒ Lectures | ☐ Group tutorials | ☐ Individual tutorials |
| ☒ Laboratory work | ☒ Project work | ☒ Seminar |
| ☐ Distance learning | ☐ Blended learning | ☐ Other |
| **Purpose and Overview (max. 5 sentences)** |
| *This course aims to provide students with a basic theoretical and practical knowledge in the field of applied mathematics such as mathematical programming, stochastic models, and simulation. It's designed to provide a broad and basic education in the techniques and modelling concepts needed to analyze and design complex systems. The course prepares students for professional employment as logistics analyst or management consultant.* |
| **Syllabus (brief outline and summary of topics, max. 10 sentences)** |
| Mathematical basics - convex sets and functions. Goal function, constraints and feasible solution. Heuristic solution. Linear Programming. Dual problems. Graphical method. Simplex method. Transportation Problem. Network problems. Integer programming. Nonlinear programming. Unconstrained problems. Method of Lagrange’s multipliers. Khun-Tucker theorem. Linearization. Penalty functions. Steepest descent (gradient) method. Newton's method. Dynamic Programming. The problem of resource allocation. Network planning. Analysis of time by CPM and PERT methods. Cost analysis. Modelling of stochastic systems and processes. Processes Markov. Queuing theory. Basics of simulation. Monte Carlo methods. Exercises, examples and applications in different models and systems. |
| **Language of Instruction** |
| ☒Serbian (complete course) | ☐ English (complete course) | ☐ Other \_\_\_\_\_\_\_\_\_\_\_\_\_ (complete course) |
| ☒Serbian with English mentoring | ☐Serbian with other mentoring \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Assessment Methods and Criteria** |
| **Pre exam Duties** | **Points** | **Final Exam** | **Points** |
| **Activity During Lectures** | **5** | **Written Examination** | **60 (depending on Teaching Colloquia)** |
| **Practical Teaching** | **5** | **Oral Examination** |  **30**  |
| **Teaching Colloquia** | **60** | **Overall Sum** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |