SYLLABUS

1. Course title:

Operations Research

2. Code:

ESKE106

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

◉ Mandatory   ◯ Elective

6. Prerequisites:

[MAT1] Mathematics I, [MAT2] Mathematics II

7. Class restrictions:

8. Duration / semester:

1   6

9. Weekly contact hours:

9.1. Lectures:	3
9.2. Seminars:	1
9.3. Laboratory/Practice classes:	1

10. Faculty:

Faculty of Electrical Engineering

11. Department/study program:

Electrical Engineering and Computer Science

12. Lecturer:

Ph.D. Mario Pejdanović, assistant prof.

13. Lecturer's e-mail:

mario.pejdanovic@untz.ba

14. Web site:

15. Course aims:

Student training for setting and solving problems of linear optimization problems and understanding of simplex methods, modeling or approximation of various problems in practice in the form of linear problems, solving simple network problems.

16. Learning outcomes:

After having mastered the subject, the students will be able to solve the problem by using the basic principles of the operational research (linear programming: SIMPLEX method, transport problem; nonlinear programming: Lagrangian multiplication method, numerical methods for solving optimization problems of higher variation functions in the constraints of different types).

17. Course content:

Introduction to the Matlab software package. Linear Programming (LP). Definitions of different types of problems in the form of LP. Graphic Solution. Simplex method: Gauss-Jordan's elimination, features of permissible solutions, base solutions, finding the first basic and optimal solution, complexity of simplex methods, degeneration, cycling and anti-cycling algorithms. Transport problem: open and closed problem, methods for finding the base and optimal solution. Post-optimal analysis. Duality in LP, Interior-point method, Nelder-Mead simplex method. Solving of other practical problems: investment allocation, capacity expansion, business merging, replacement and selection of equipment, inventory management, mix problem. Heuristic methods of solving. Linear integer problems: the method of branching and fencing and the method of implicit enumeration. Dynamic and heuristic programming. Network Planning and Management, Time Analysis by CPM and PERT Methods. Waiting queues. Introduction to Game Theory.

18. Learning methods:

Theoretical knowledge is gained by students through lectures and auditorial exercises. Practical knowledge includes independent work of students through homework, auditorial exercises and laboratory exercises (application of software tools and self-solving problems of smaller dimensions).

19. Assessment methods:

The exam is passed through a partial test and a final exam.

20. Assessment components:

The student gains points through attendance at lectures, audit and laboratory exercises, and through two partial examinations, the first of which is the partial exam in the middle of the semester, and the second one after the semester and the fulfillment of all the obligations.

21. Required reading list:

J.Petrić: "Operaciona istraživanja", Nauka, Beograd, 1997.
D.Kalpić, V.Mornar: "Operacijska istraživanja", DRIP Zagreb, 1996.
W.Winston, Operations Research: "Application and Algorithms", Duxbury Press, 2003.

22. Web sources:

23. Applicable starting from the academic year:

2016/2017

24. Adopted in the Faculty/Academy session:

04.04.2016