

DESCRIPTION OF A STUDY COURSE – SYLLABUS

Title of a course	Operational Research in Transport				
Head of course	MSc Mirjana Rakamarić Grica, Senior Lecturer				
Study programme	Professional undergraduate study Transport				
Status of a course	Obligatory				
Year of study	2.	Semester	IV	ECTS credits	4
Teaching plan (L + E + S+ Pr)	3+2+0+0				
Goals of a course					
The aim of the course is to introduce and teach students how to use methods that solve some business decision-making problems and methods to optimize them.					
Conditions for enrolling course					
No conditions					
Learning outcomes on a level of a study programme which includes course					
Outcome 1: Use mathematical and statistical methods in traffic engineering and traffic research. Outcome 7: Conduct field research in road transport and interpret the result. Outcome 14: Independently present professional content on oral, written and graphical basis using the usual tools in Croatian and/or foreign language.					
Expected learning outcomes on a level of a course					
<ol style="list-style-type: none"> 1. Explain concepts from the basics of linear programming. 2. Solve problems from the basics of linear programming. 3. Explain concepts from the basics of transport problem. 4. Solve problems from the basics of transport problem. 					
Content of a course					
<p>Term meaning, operational research history. Recent cases of OR successful implementation. Mathematical model. Linear programming. Linear programming problem mathematical model. Transforming real problems into mathematical model. Graphic problem solutions. Problem canonization. Determination of initial basic solution. Simplex method. Big-M method. Solution sensibility problem. Dual problem and economic interpretation of dual variables.</p> <p>Definition of transport problems. Open and closed problems. Bringing open problems down to closed ones. The initial basic solution determining methods (the north-west angle method, the lowest price method, the Vogel method). The optimum solution determining methods (distribution method, modified distribution method). Transport model different modifications and restrictions (impermissible communications, communication limited capacity.</p>					
Teaching modes	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> auditory exercises <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> distance learning <input type="checkbox"/> field classes		<input checked="" type="checkbox"/> individual assignments <input type="checkbox"/> multimedia and network <input type="checkbox"/> laboratory <input type="checkbox"/> supervisor's work <input type="checkbox"/> other _____		
Comments					
Students' obligations					
Grading, evaluation and monitoring of students' work continuously during lectures and exams					
Grading is based upon evaluation of course's learning outcomes' adoption. Grading is performed continuously during lectures and/or during exam, in compliance with the provisions of Regulation on the assessment of students.					

Continuous check-up:

Outcomes	Pre-exam I	Pre-exam 2	Pre-exam 3	Test 1	Test 2	Threshold	Max
Outcome 1				15%		7,5%	15%
Outcome 2	13%	34%				23,5%	47%
Outcome 3					15%	7,5%	15%
Outcome 4			23%			11,5%	23%
Percentage of ECTS	0,52	1,36	0,92	0,6	0,6	-	4
Total	13%	34%	23%	15%	15%	50 %	100 %

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Exam term:

Outcomes	Written exam	Oral exam	Max
Outcome 1		15%	15%
Outcome 2	47%		47%
Outcome 3		15%	15%
Outcome 4	23%		23%
Percentage of ECTS	2,8	1,2	4
Total	70%	30%	100 %

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Grading:

A student has passed the exam if he has acquired at least 50% of anticipated credits of a specific learning outcome.

If a student has passed learning outcomes of all courses, the accomplished credits (percentages) of all passed learning outcomes are being added, while the final grade is defined upon following table:

Range of credits (percentages)	Numerical grade	ECTS grade
90,00 – 100,00	Excellent (5)	A
75,00 – 89,99	Very good (4)	B
60,00 – 74,99	Good (3)	C
50,00 – 59,99	Sufficient (2)	D
0,00 – 49,99	Insufficient (1)	F

Obligatory literature

1. H. Pašagić: Matematičke metode u prometu, Fakultet prometnih znanosti, Zagreb 2003.
2. Materials from lectures and exercises.

Additional literature

1. H. Pašagić, B. Ivanković, N. Kapetanović: Operacijska istraživanja u prometu, zbirka zadataka, 2013.,
2. D. Barković: Operacijska istraživanja, Ekonomski fakultet Osijek, 2002.
3. Z. Babić: Linearno programiranje, Ekonomski fakultet Split, 2005.
4. D. Kalpić, V. Mornar: Operacijska istraživanja, Drip, Zagreb 1996.

