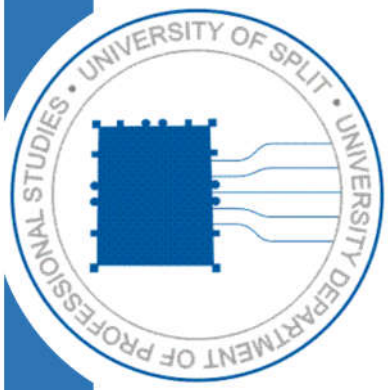
Course syllabus

Operations Research using MS EXCEL



COURSE DETAILS		
Type of study programme	Graduate professional study programme- 120 ECTS	
Study programme	ACCOUNTING AND FINANCE	
Course title	Operation Research Using MS Excel	
Course code	DRF005	
ECTS (Number of credits allocated)	6	
Course status	Core	
Year of study	First	
Course Web site	https://moodle.oss.unist.hr/course/category.php?id=21	
Total lesson hours per semester	Lectures	30
	Practicals	-
	Laboratory exercises & practical demonstration	30
Prerequisite(s)	None	
Lecturer(s)	Bože Plazibat, Ph.D., College professor	

COURSE DESCRIPTION	
Course Objectives:	• acquire elements of MS Excel "what-if" analysis as efficient tools for decision making support, • to gain fundamental principles and methods in solving linear programming problems and corresponding sensitivity analysis; both using linear approach and MS Excel Solver, • enable students to apply acquired knowledge both in transport and assignment problems solving.
Learning outcomes ***On successful completion of this course, student should be able to:***	1. present appliance of MS Excel "what-if" analysis in economic problem solving, 2. define basic concepts and theorems of linear programming, 3. identify and develop mathematical model from verbal description of the problem, 4. describe appliance of the graphical method to find a solution of LP problems with two decision variables, 5. demonstrate usage of MS Excel Solver in solving LP problems with more decision variables, 6. discuss sensitivity of the optimal solution, both due to changes od decision variables coefficients and right hand side of constraints, 7. demonstrate usage of MS Excel Solver in closed/open transport and assignment problem solving, with or without additional conditions.
Course content	**Introductions**. Historical development of operation research and examples of its sufficient usage. Basic terms. **Fundamentals of MS Excel "what-if" analysis**. Usage of *Goal Seek* function. Appliance of *Data Table* function in calculating series of discreet output that depend on one or two variables. Usage of *Scenario Manager* procedure: adding, showing, deleting and changing scenarios; generation of scenario summaries. **Linear programming.** Mathematical basis. Creating and developing models. Objective function and decision variables. Constraints. The fundamental theorem of linear programming. Definition of the the solution. Existence of optimal solutions. Graphical approach. Sensitivity analysis. **MS Excel Solver.** Introduction: algorithms and methods. Basic opportunities. Building up the model: objective function, decision variables, constraints. Starting and controlling Solver. Types of possible results. Solver reports: Answer report, Sensitivity report and Limits report. Practical usage of Solver in finding optimal solution (minimum or maximum) of: diet problem, product mix problem, advertising problem, budgeting problem, etc. Special cases of LP problems: transport and assignation problems, both closed and open.

CONSTRUCTIVE ALIGNMENT – Learning outcomes, teaching and assessment methods

Alignment of students activities with learning outcomes		
Activity	**Student workload ECTS credits**	**Learning outcomes**
Lectures	30 hours / 1,0 ECTS	1, 3,4,5,6,7
Practice	30 hours / 1,0 ECTS	2,3,4,5,6,7
Laboratory work	15 hours / 0,5 ECTS	2,3,4,5,6,7
Three mid-term exams (preparation and delivery)	45 hours / 1,5 ECTS	2,3,4,5,6,7
Self study	45 hours / 1,5 ECTS	1,2,3,4,5,6,7
Final exam (preparation and delivery)	15 hours / 0,5 ECTS	1,2,3,4,5,6,7
TOTAL:	**180 hours / 6 ECTS**	**1,2,3,4,5,6,7**

CONTINUOUS ASSESSMENT		
Continuous testing indicators	**Performance A_i (%)**	**Grade ratio k_i (%)**
*Class attendance and participation**	70 - 100	10
First mid-term exam	60 - 100	20
Second mid-term exam	60 - 100	35
Third mid-term exam	60 - 100	35

** for part-time students required performance is 40-100%*

FINAL ASSESSMENT		
Testing indicators – final exam (first and second exam term)	**Performance A_i (%)**	**Grade ratio k_i (%)**
Previous activities	70 - 100	10
First part: elements of MS Excel "what-if" analysis	60 - 100	20
Second part: LP – graphic approach	60 - 100	35
Third part: LP – MS Excel Solver	60 - 100	35
Testing indicators – makeup exam (third and fourth exam term)	**Performance A_i (%)**	**Grade ratio k_i (%)**
First part: elements of MS Excel "what-if" analysis	60-100	26
Second part: LP – graphic approach	60-100	37
Third part: LP – MS Excel Solver	60-100	37

PERFORMANCE AND GRADE		
Percentage	**Criteria**	**Grade**
60% - 69,9%	*basic criteria met*	sufficient (2)
70% - 79,9%	*average performance with some errors*	good (3)
80% - 89,9%	*above average performance with minor errors*	very good (4)
90% - 100%	*outstanding performance*	outstanding (5)

ADDITIONAL INFORMATION

Teaching materials for students (scripts, exercise collections, examples of solved exercises), teaching record, detailed course syllabus, application of e-learning, current information and all other data are available by MOODLE system to all students (https://moodle.oss.unist.hr/).