OPERATIONS RESEARCH I

1	Course Title:	OPERATIONS RESEARCH I	
2	Course Code:	END3033	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	3	
6	Semester:	5	
7	ECTS Credits Allocated:	5.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	1	
11	Prerequisites:	Introduction to Mathematical Programming	
12	Language:	English	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç. Dr. BURCU ÇAĞLAR GENÇOSMAN	
15	Course Lecturers:	Doç.Dr. Burcu ÇAĞLAR GENÇOSMAN	
16	Contact information of the Course Coordinator:	e-posta: burcucaglar@uludag.edu.tr, Telefon: + 90 (224) 294 09 16 Adress: Uludağ Üniversitesi, Mühendislik-Mimarlık Fakültesi, Endüstri Mühendisliği Bölümü, Görükle Kampüsü, 16059 Nilüfer, Bursa	
17	Website:		
18	Objective of the Course:	Learning operations research techniques, and finding the best solution using the building-up analytical thinking approach.	
19	Contribution of the Course to Professional Development:	It's been planned to contribute to professional development by analyzing real life problems by scientific methods and offering solutions.	
20	Learning Outcomes:		
		1	Being able to solve linear programming problems using the simplex / atrificial starting solution / two phase simplex methods.
		2	Having knowledge about special cases of the simplex algorithm, and being able to interpret the solutions and results.
		3	Being able to perform sensitivity analysis on the solutions of linear programming models.
		4	Being able to model and solve transportation problems and assignment problems.
		5	Being able to model and solve network problems and CPM.
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21	Course Content:		

Course Content:

Week	Theoretical	Practice

1	Introduction Solution of Linear Programming Problems: Simplex Method -Standard and canonical forms -Introduction to simplex algorithm	Using MS Excel Solver for modeling linear programming problems.
2	Solving linear programming problems using simplex algorithm.	Using MS Excel Solver for the solution of linear programming problems, and interpreting results.
3	Artifical Starting Solution (Big M Method)	Using Lindo for modeling and solving linear programming problems, interpreting results.
4	Two-Phase Simplex Method	Using Lindo for modeling and solving linear programming problems, interpreting results.
5	Special Cases of Simplex Algorithm -Degeneracy -Infeasibility -Unbounded Solution Simplex algorithm for unbounded variables	Sensitivity analysis practices in Lindo
6	Sensitivity Analysis -Objective function coefficient changes -Right hand side changes	Sensitivity analysis practices in Lindo
7	Sensitivity Analysis -Objective function coefficient changes -Right hand side changes	How to download setup and use IBM ILOG Cplex Optimization Studio software
8	Duality Primal / Dual Problems / Variables Primal / Dual Transformation Relations between the Primal / Dual Solutions/Complementary Slackness theorem	How to use IBM ILOG Cplex Optimization Studio software
9	Introduction to transportation problems /balanced transportation problem / finding basic feasible solutions of transportation problems	Representation of parameters, decision variables and constraints in IBM ILOG Cplex Optimization Studio and some examples
10	Transportation simplex algorithm	Representation of parameters, decision variables and constraints in IBM ILOG Cplex Optimization Studio and some examples
11	Assignment problems/Floyd algorithm/Dijkstra algorithm	Modeling, solving and interpreting results of linear programming problems using CPLEX
12	Minimum spanning tree problems /Maximum	Modeling, solving and interpreting results of linear
13	Review studies of OR I topics with examples	Modeling, solving and interpreting results of linear
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22	Textbooks, References and/or Other	1. Winston, W.L., Operations Research: Applications and 2. Hillier, F.S.; Lieberman, G.J., Introduction to Operations
23	Assesment	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	14	1.00	14.00
Self study and preperation	14	5.00	70.00
Homeworks	2	5.00	10.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	7.00	7.00
Others	0	0.00	0.00
Final Exams	1	7.00	7.00
Total Work Load			157.00
Total work load/ 30 hr			5.00
ECTS Credit of the Course			5.00

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Midterm Exam	1	30.00
Quiz	0	0.00
Home work-project	5	10.00
Final Exam	1	60.00
Total	7	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		1 Midterm Exam + 4 Homeworks + 1 Term Project + 1 Final Exam

24	ECTS / WORK LOAD TABLE

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	5	5	5	5	5	5	5	5	5	2	2	1	1	1	0	0
ÖK2	4	4	4	4	2	2	4	4	4	2	2	1	1	1	0	0
ÖK3	3	3	2	2	2	2	4	4	4	2	2	1	1	1	0	0
ÖK4	5	5	5	5	5	5	5	5	5	2	2	1	1	1	0	0
ÖK5	5	5	5	5	5	5	5	5	5	2	2	1	1	1	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	**1 very low**		**2 low**			**3 Medium**			**4 High**			**5 Very High**				