APPLIED MATHEMATICAL MODELLING										
1	Course Title:	APPLIED	D MATHEMATICAL MODELLING							
2	Course Code:	END4279								
3	Type of Course:	Optional								
4	Level of Course:	First Cyc	le							
5	Year of Study:	4								
6	Semester:	7								
7	ECTS Credits Allocated:	3.00								
8	Theoretical (hour/week):	1.00								
9	Practice (hour/week):	0.00								
10	Laboratory (hour/week):	2								
11	Prerequisites:	None								
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:	The aim of this course is to gain the basic knowledge of developing solution algorithms and improve the students' level of knowledge by teaching them how to solve real-world complex problems.								
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	Ability to understand current mathematical models.							
		2	Gain the ability to analyze decision problems.							
		3	Ability to transform theoretical problems to mathematical model formulation.							
		4	Ability to transform real-world problems to mathematical model formulation.							
		5								
		6								
		7								
		8								
		9								
		10								
21	Course Content:									
		Co	ourse Content:							
Week	Theoretical		Practice							
1	Introduction to Mathematical Modelir solvers/ The History of Modeling Lar in Optimization	ng and nguages	How to download setup and use IBM ILOG Cplex Optimization Studio software							

2	Basic terminology and an overview/W integer programs?/7 Assumptions on	′hy MIP	How to download setup and use IBM ILOG Cplex Optimization Studio software							
3	Examples for integer programming I: Two Crude Petroleum model Large Scale Optimization and Indexin	g	How to use IBM ILOG Cplex Optimization Studio software							
4	Examples for integer programming II: Volsay Gas Production Problem Pi Hybrid model		Representation of parameters, decision variables and constraints in IBM ILOG Cplex Optimization Studio and some examples							
5	Building Linear Programming Models Workforce Planning/ Learning how to represent exceptions, ranges, tuples a in OPL	for and sets	Representation of parameters, decision variables and constraints in IBM ILOG Cplex Optimization Studio and some examples							
6	Building Linear Programming Models for CPM, Supply Chain/ Learning how to represent exceptions, ranges, tuples and sets in OPL Representation of parameters, decision variables and constraints in IBM ILOG Cplex Optimization Studio and some examples									
7	Transformation using 0-1 variables/Th of discrete variables/Indicator variable constraints/Logical conditions and 0– variables/Polynomial expressions	ne uses es for 1	Modeling, solving and interpreting results of linear programming problems using CPLEX							
8	Special ordered sets of variables/Extra conditions applied to linear programming models/Disjunctive constraints/Non-convex regions									
q Activit	Limiting the number of variables in a. ES		Μ	odeling_solving and in Number	terpreting results o Duration (hour)	f linear Total Work Load (hour)				
Theore	All-or-Nothing Situations/Wodeling Elt	ner-Or	IV pi	ogening, solving and in ogramming problems	terpreting results o 1.00 using CPLEX	Integer 14.00				
Practica	als/Labs			14	2.00	28.00				
Self stu	Scheduling/Knapsack Problem		р	ogramming problems	15:00 CPLEX	28.00				
Homew	vorks			1	10.00	10.00				
Project	Problem/Cutting-stock problems/Trav	eling	•	1	10.00	10.00				
Field St	tudies			0	0.00	0.00				
Midtern	1 exams		p	ogramming problems	using CPLEX	1.50				
Others				0	0.00	0.00				
Final E	examples		р	ogramming problems	using CPLEX	1.00				
Total W	/ork Load					94.00				
Total w	Matelalso hr		e	d., H. Paul Williams, W	ILEY.	3.08				
ECTS (Credit of the Course		•		anne nanare	3.00				
			 Wayne L. Winston, Duxbury Press, ISBN 0-534 20971-8., Applied Integer Programming, Modeling and Solution. Der-San Chen, Robert G. Batson, Yu Dang, Wiley, 2010. ISBN 978-0-470-37306-4, IBM ILOG CPLEX OPTIMIZATION STUDIO (OPL) Documentation 							
23	Assesment									
TERM L	EARNING ACTIVITIES	NUMBE R	WEIGHT							
Midtern	n Exam	1	30.00							
Quiz		0	0.00							
Home v	vork-project	6	10.00							
Final E	xam	1	60.00							

Total 8								10	100.00								
Contribution of Term (Year) Learning Activities to Success Grade								40.	40.00								
Contribution of Final Exam to Success Grade								60.	60.00								
Total									100.00								
Measurement and Evaluation Techniques Used in the Course								ne Th fina	The Midterm exam + 5 homeworks + 1 term project + the final exam								
24 ECTS / WORK LOAD TABLE																	
25	25 CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS																
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ1 0	PQ11	PQ12	PQ1 3	PQ14	PQ15	PQ16	
ÖK1	5	5	5	5	4	4	4	4	4	1	1	2	2	2	0	0	
ÖK2	5	5	5	5	4	4	4	4	4	1	1	2	2	2	0	0	
ÖK3	5	5	5	5	4	4	4	4	4	1	1	2	2	2	0	0	
ÖK4	5	5	5	5	4	4	4	4	3	1	1	2	2	2	0	0	
LO: Learning Objectives PQ: Program Qualifications																	
Contrib ution Level:	1 very low 2 low				3 Medium			4 High			5 Very High						