Universidad
Carlos III de Madrid
www.uc3m.es

COURSE: Mathematical optimization for business		
DEGREE: Bachelor in Management and Technology	YEAR: 3, 4	TERM: 2

WEEKLY PLANNING								
			GROUPS (mark X)		Special room for session (computer classroom, audio-visual classroom…)	WEEKLY PROGRAMMING FOR STUDENT		
WEEK	SESSION	DESCRIPTION	LECTURES	SEMINARS		DESCRIPTION	CLASS HOURS	HOMEWORK HOURS (Max. 7h week)
1	1	Topic 1.1. Linear optimization (LO). Operations research; LO models; formulations and applications; computer-based solution.	X		online	Study of Topic 1.1	1,5	6
1	2	Practical class. Linear optimization.		X	in-class laptops	Computer lab class	1,5	
2	3	Topic 1.2. Graphical solution; sensitivity analysis.	X		online	Study of Topic 1.2	1,5	6
2	4	Practical class.		X		Exercises of Topic 1.2	1,5	
3	5	Topic 1.3. The fundamental theorem of LO; basic feasible solutions and vertices; the simplex method.	X		online	Study of Topic 1.3	1,5	6
3	6	Practical class.		X		Exercises of Topic 1.3	1,5	
4	7	Topic 1.4. The two-phase simplex method; interior point methods.	X		online	Study of Topic 1.4	1,5	6

4	8	Practical class.		X		Exercises of Topic 1.4	1,5	
5	9	Topic 1.5. Optimal network flow models.	X		online	Study of Topic 1.5	1,5	6
5	10	Practical class.		X	in-class laptops	Computer lab class	1,5	
6	11	Topic 1.6. More applications and examples.	X		online	Study of Topic 1.6	1,5	6
6	12	**1st midterm exam**		X		**1st midterm exam**	1,5	
7	13	Topic 2.1. Integer optimization models; linear relaxations; optimality gap; graphical and computer solution.	X		online	Study of Topic 2.1	1,5	6
7	14	Practical class.		X		Exercises of Topic 2.1	1,5	
8	15	Topic 2.2. The Branch and Bound method.	X		online	Study of Topic 2.2	1,5	6
8	16	Practical class.		X		Exercises of Topic 2.2	1,5	
9	17	Topic 2.3. Combinatorial optimization models; strengthening formulations; valid inequalities.	X		online	Study of Topic 2.3	1,5	6
9	18	Practical class.		X	in-class laptops	Computer lab class	1,5	
10	19	Topic 2.4. More applications and examples.	X		online	Study of Topic 2.4	1,5	6
10	20	**2nd midterm exam**		X		**2nd midterm exam**	1,5	
11	21	Topic 3.1: Unconstrained non-linear optimization (NLO). Motivation and examples; local and global optima; convexity; optimality conditions; numerical solution.	X		online	Study of Topic 3.1	1,5	6
11	22	Practical class.		X		Exercises of Topic 3.1	1,5	
12	23	Topic 3.2. Equality-constrained NLO. Motivation and examples; Lagrange multipliers; optimality conditions; numerical solution.	X		online	Study of Topic 3.2	1,5	6
12	24	Practical class.		X		Exercises of Topic 3.2	1,5	
13	25	Topic 3.3. Inequality-constrained NLO. Motivation and examples; Karush-Kuhn-Tucker multipliers; optimality conditions; numerical solution.	X		online	Study of Topic 3.3	1,5	6
13	26	Practical class.		X	in-class laptops	Computer lab class	1,5	
14	27	Topic 3.4. More applications and examples.	X		online	Study of Topic 3.4	1,5	6

14	28	**3rd midterm exam**		X		**3rd midterm exam**	1,5	
					Subtotal 1		42	84
			Total 1 *(Hours of class plus student homework hours between weeks 1-14)*				126	

15		Tutorials, handing in, etc				Tutorials	6	
16								
17		Assessment					3	15
18								
					Subtotal 2		3	21
			Total 2 *(Hours of class plus student homework hours between weeks 15-18)*				24	

TOTAL *(Total 1 + Total 2)*	150