Universidad Carlos III de Madrid
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COURSE: WIRELESS TRANSMISSION AND PROPAGATION		
DEGREE: BACHELOR in COMMUNICATION SYSTEM ENGINEERING	**YEAR: 4th**	**SEMESTER: 1st**

WEEKLY ORGANIZATION

WEEK	SESSION	DESCRIPTION OF THE SESSION	GROUP (with X)		Indicate if space different from classroom (computer room, laboratory, etc.)	Indicate YES/NO if it is a session with two teachers	Student work		
			LECTURE	SMALL GROUP			DESCRIPTION	Class hours	Student workload per week (Max. 7hours)
1	1	**Presentation** • Introduction to the course • Definition of antenna and its key role in the radiocommunication systems **Unit 1: Antenna main parameters**: • Radiation pattern • Directivity	X		NO	NO	Revision of some concepts already seen in Electromagnetic Fields course	1,66	
1	2	**Unit 1: Antenna main parameters**: • Gain • Efficiency • Bandwidth • Effective area and Friis equation		X	NO	NO	Self-study to prepare for the test	1,66	4

2	3	**Unit 2: Wire antennas** • Calculation of the field radiated by a linear current: vector potential • Short dipole. Radiation zones	x		NO	NO	Revision of the theory seen in the lectures and resolution of basic exercises and practical examples	1,66	
2	4	**Unit 2: Wire antennas** • Resolution of Problems		x	NO	NO	Revision of the theory seen in the lectures. Examples of calculation of antenna parameters	1,66	5
3	5	**Unit 2: Wire antennas** • Small loop • Dipole with any lenght and uniform and sinusoidal current	x		NO	NO	Self-study to prepare for the test	1,66	
3	6	**Unit 2: Wire antennas** • Resolution of Problems		x	NO	NO	Resolution of proposed problems	1,66	5
4	7	**Unit 2: Wire antennas** • Travelling wave antennas	x		NO	NO	Revision of the theory seen in the lectures. Resolution of examples of radiation patterns for antennas with different lenghts	1,66	
4	8	**Lab 1** Calculation of radiation pattern of wire antennas with MATLAB		x	Computer rooms from UCIIIM	SI	The radiation patterns of different wire antennas will be calculated and represented by using the tool MATLAB	1,66	6
5	9	**Unit 2: Wire antennas** • Practical considerations: monopole antenna, folded dipole	x		NO	NO	Revision of the theory seen in the lectures	1,66	
5	10	**Unit 2: Wire antennas** Resolution of Problems		x	NO	NO	Resolution of proposed problems	1,66	6
6	11	*Individual Test (Units 1 and 2)*	x		NO	NO	Self-study to prepare for the test	1,66	
6	12	**Unit 3: Arrays** • Superposition: Array Factor • Uniform Arrays		x	NO	NO	Revision of the theory seen in the lectures	1,66	5
7	13	**Unit 3: Arrays** • Progressive phase: electronic scanning arrays • Grating lobes	X		NO	NO	Revision of the theory seen in the lectures. Resolution of exercices of arrays with different distances inter-elements and different number of elements	1,66	
7	14	**Unit 3: Arrays** • Arrays with non uniform amplitudes • Binomial Array		X	NO	NO	Revision of the theory seen in the lectures	1,66	6

8	15	**Unit 3: Arrays** • Array sinthesis: Schelkunoff circle •	X		NO	NO	Revision of the theory seen in the lectures . Resolution of exercises with phased arrays	1,66	
8	16	**Lab 2.** Calculation of radiation pattern fo arrays with MATLAB		X	Computer rooms from UCIIIM	SI	The radiation patterns of different arrays antennas will be calculated and represented with the mathematical tool MATLAB	1,66	6
9	17	**Unit 3: Arrays** • Plannar arrays	X		NO	NO	Revisión de la teoría dada en clase. Resolution of exercices of array synthesis by using Schelkunoff methodology	1,66	
9	18	**Unit 3: Arrays** • Resolution of Problems		X	NO	NO	Resolution of proposed problems	1,66	5
10	19	*Individual test (Unit 3)*	X		NO	NO	Self-study to prepare for the test	1,66	
10	20	**Unit 4: Aperture Antennas** • Equivalente • Magnetic Vector Potential		X	NO	NO	Revision of the theory seen in the lectures	1,66	5
11	21	**Unit 4: Aperture Antennas** • Aperture field distributions	X		NO	NO	Revision of the theory seen in the lectures. Resolution of examples of calculations of radiation of aperture antennas	1,66	
11	22	**Unit 4: Aperture Antennas** • Horns • Graphs for calculation of radiation pattern		X	NO	NO	Revision of the theory seen in the lectures	1,66	6
12	23	**Unit 4: Aperture Antennas** • Examples of designs • Reflectors: types.	X		NO	NO	Revision of the theory seen in the lectures. Resolution of calculation of horn radiation patterns	1,66	
12	24	**Unit 4: Aperture Antennas** • Resolution of Problems		X	NO	NO	Resolution of proposed problems	1,66	6
13	25	**Unit 4: Aperture Antennas** • Reflectors: efficiencies • Lenses	X		NO	NO	Revision of the theory seen in the lectures	1,66	
13	26	**Lab 3.** Calculation of radiation pattern of aperture antennas with MATLAB		X	Computer rooms from UCIIIM	SI	The radiation patterns of different aperture antennas will be calculated using the mathematical tool MATLAB	1,66	5
14	27	*Individual test (Unit 4)*	X		NO	NO	Self-study to prepare for the test	1,66	6

14	28	COMMON TUTORSHIP: revision of the main concepts in the course and resolution of exercises		X	NO	NO	Revision of the main concepts of the course	1,66	
12	29	**Lab 4.** Antenna measurement: measurement of antenna impedance with network analyzer and measurement of radiation pattern.		X	Laboratories of Dpto. TSC	SI	Introduction to antenna measurement in a lab	1,66	2
							Subtotal 1	**48,33**	**78**
		Total 1 *(Teaching hours and student work in weeks 1-14)*							
15		Making-up classes, delivery of homework, office hours						1.66	
16		Preparing the evaluation and evaluation itself						3	
17									
18									25
							Subtotal 2	**3**	
		Total 2 *(Teaching hours and student work in weeks 15-18)*						26.66	
TOTAL *(Total 1 + Total 2. Max 180 hours)*								**153**	