



DENOMINACIÓN ASIGNATURA: Signal Processing in Communications		
POSTGRADO: MÁSTER UNIVERSITARIO EN Multimedia and Communications	ECTS: 6	CUATRIMESTRE: 1st
Profesor/a: David Ramírez García		

CRONOGRAMA DE LA ASIGNATURA (versión detallada)								
SEMANA	SESIÓN	DESCRIPCIÓN DEL CONTENIDO DE LA SESIÓN (En su caso, incluir las recuperaciones, tutorías, entrega de trabajos, etc)	GRUPO (marcar X)		Indicar espacio Necesario distinto aula (aula informática, audiovisual, etc..)	TRABAJO DEL ALUMNO DURANTE LA SEMANA		
			1	2		DESCRIPCIÓN	HORAS PRESENCIALES	HORAS TRABAJO
1	1	Course presentation and introduction to Wireless communications	X			Reinforcing course material at home.	1.5	4
	2	Introduction to MIMO communication systems, fading, and MIMO channel modelling	X			Reinforcing course material at home.	1.5	4
2	3	Capacity of MIMO systems: introduction and deterministic channels	X			Reinforcing course material at home	1.5	4
	4	Capacity of MIMO systems: channels with fading. Diversity-multiplexing trade-off. Review of estimation theory: MMSE	X			Reinforcing course material at home.	1.5	4
3	5	LMMSE estimation	X			Reinforcing course material at home.	1.5	4
	6	LS and reduced-rank estimation	X			Reinforcing course material at home.	1.5	4



4	7	Adaptive linear estimators	X			Reinforcing course material at home.	1.5	4
	8	Review of detection theory: Neyman-Pearson lemma, probabilities of detection and false alarm, ROC curves	X			Reinforcing course material at home. Prepare tutorial 1.	1.5	4
5	9	Introduction to detection with unknown parameters: GLRT, UMPIT, LMPIT.	X			Reinforcing course material at home. Prepare tutorial 1.	1.5	4
	10	Correct tutorial 1.	X			Reinforcing course material at home.	1.5	4
6	11	Correct tutorial 1.	X			Reinforcing course material at home.	1.5	4
	12	Hands-on time (using Matlab) to solve the proposed problems of tutorial 1.	X		Classroom with PCs and Matlab installed.	Finishing the Matlab exercises of the tutorial.	1.5	4
7	13	Hands-on time (using Matlab) to solve the proposed problems of tutorial 1.	X		Classroom with PCs and Matlab installed.	Finishing the Matlab exercises of the tutorial.	1.5	4
	14	Introduction to spatial multiplexing (SM) and MIMO detection. Detectors for SM systems: ZF detector, MMSE detector, and Null & cancelling.	X			Reinforcing course material at home.	1.5	4
8	15	Detectors for SM systems: Sphere-decoding and SDR-based detectors	X			Reinforcing course material at home. Prepare for assignment 1.	1.5	4



	16	Hands-on time (using Matlab) to solve assignment 1.	X		Classroom with PCs and Matlab installed.	Working on assignment 1.	1.5	4
9	17	Hands-on time (using Matlab) to solve assignment 1.	X		Classroom with PCs and Matlab installed.	Hand in assignment 1.	1.5	4
	18	Introduction to space-time block coding. Design of space-time block codes (STBCs). Signal model for STBCs and STBC decoding.	X			Reinforcing course material at home.	1.5	4
10	19	Orthogonal and quasi-orthogonal STBCs	X			Reinforcing course material at home, prepare for assignment 2.	1.5	4
	20	Hands-on time (using Matlab) to solve assignment 2.	X		Classroom with PCs and Matlab installed.	Reinforcing course material at home.	1.5	4
11	21	Hands-on time (using Matlab) to solve assignment 2.	X		Classroom with PCs and Matlab installed.	Reinforcing course material at home, finishing and hand in assignment 2.	1.5	4
	22	Introduction to cognitive radio (CR). Spectrum sensing for CR.	X			Reinforcing course material at home.	1.5	4
12	23	Basic techniques for spectrum sensing: Matched filter, cyclostationarity-based detectors and energy detector	X			Reinforcing course material at home.	1.5	5
	24	Robustness of the energy detector. Multiantenna and cooperative detectors.	X			Reinforcing course material	1.5	5



						at home, prepare for assignment 3.		
13	25	Hands-on time (using Matlab) to solve assignment 3.	X		Classroom with PCs and Matlab installed.	Reinforcing course material at home.	1.5	5
	26	Hands-on time (using Matlab) to solve assignment 3.	X		Classroom with PCs and Matlab installed.	Reinforcing course material at home, finish and hand in assignment 3.	1.5	5
14	27	Final assignment: student presentations	X				1.5	
	28	Final assignment: student presentations	X				1.5	
TOTAL HORAS							42	108