Universidad Carlos III de Madrid

SUBJECT: Multidisciplinary Applications of Information Technologies and Communications		
MASTER DEGREE: Telecommunications Engineering	ECTS:6	QUARTER: 1

TIMETABLE FOR THE SUBJECT

WEEK	SESSION	DESCRIPTION OF EACH SESSION	GROUP (X mark)		Indicate if a different lecture room is needed (computer, audiovisual, etc.)	HOMEWORK PER WEEK		
			1	2		DESCRIPTION	ATTENDING HOURS	HOMEWORK Max. 7,5H/WEEK
1	1	Course introduction: Modules, Objectives, evaluation Module 1 Introduction: Healthcare • Healthcare • Interoperability requirements				To understand healthcare requirements. Review of standards	1.5	7.5
	2	Electronic Health Record • Introduction • Data • Summary HER				To understand EHR Data in Medicine	1.5	
2	3	EHR Interoperability • Standards • Epsos project				To study EHR standards	1.5	7.5
	4	Data access security • Technologies • Legislation				To study security technologies to guarantee privacy and legislation	1.5	
3	5	Networks and communications infrastructure (I) • Healthcare intranet • Network topologies				To study communications infrastructure in healthcare	1.5	7.5
	6	Networks and communications infrastructure (II) • SNS Central Node • Regional networks				To study communications infrastructure in healthcare	1.5	

4	7	Healthcare Business Model • Public Healthcare Financing • Private Public management Models				To understand the financing models and agents	1.5	7.5
	8	Smart cities introduction • Sensor networks • Mobility • Applications				To study types and sensor networks Comparation between cities developments Application analysis	1.5	
5	9	Smart Cities initiatives • Current initiatives • New services				State of the art analysis Success implementations New applications and services	1.5	7.5
	10	Big Data and Smart Cities • Integration of data sources • Large data volume exploitation				Data heterogeneous integration. Analysis and exploitation of large volume of data	1.5	
6	11	Business model • Ecosystem • Commercial models				Drivers and barriers. Business model analysis	1.5	7.5
	12	Module 3: Military Communications • Communications in the environment • Tactical communications				Military communications classification: systems and subsystems	1.5	
7	13	Electronic war in communications • Electronic War • Support technics, defense and electronic attacks				Information superiority and war operative cycle. War electronic technics in communications	1.5	7.5
	14	Links for tactical data distribution • Link 16 • Other tactical links				Technical description of Link 16 communications network. Other network description (Link 11, Link	1.5	

						22, JTRS) and dedicated data links		
8	15	Module 4: Electromagnetic compatibility				Terminology and introduction. Electromagnetic fields equations. Electrodynamic equations. Radiation fields	1.5	7.5
	16	Electromagnetic compatibility				Transmission and absorption of electromagnetic fields. Transmission lines. Interferences. Electromagnetic field shielding	1.5	
9	17	Module 5: Electromagnetic emissions evaluation				Fundaments of antennas. Antennas for electromagnetic compatibility	1.5	7.5
	18	Electromagnetic emissions evaluation				Measurement of electromagnetic compatibility	1.5	
10	19	Module 6: Introduction to Computational Finances • Fundamental concepts. Problems and approaches				Review of the basic concepts in finances and finances markets. Presentation of 3 computational approaches: orthodox financing, machine learning nad agents based	1.5	7.5

	20	• Financial risks and associated technologies. Basel consequences				Concept of risk in finances. Basic topology. Description of Basel III and potential consequences in process and data support	1.5	
11	21	• Machine learning technics for decisions support in finances				Review of basic concepts of machine learning and the application to the decision support in finances	1.5	7.5
	22	• Information markets and decision support in venture capital				Introduction to information markets as a tool for selection of optimal options in venture capital investments	1.5	
12	23	Module 7: Speech, audio, image and video on mobile and internet environments • Fundamental concepts • Audiovisual perception and speech production				To understand basic mechanism for speech generation and audiovisual perception	1.5	7.5
	24	Multimedia processing tools • Speech, audio and video tools in the frequency and time domains • Image processing basic tools				Review of fundamental concepts of signal processing in the frequency and time domains. To understand the application of the processing techniques to the multimedia signals analysis	1.5	
13	25	Source codification and codification standards for communication • Speech and audio standards • MPEG standards				Comparation between basic technics of speech and audio codification. Standards review	1.5	7.5

	26	Source codification and codification standards for communication • Image and video codification • Standards				To understand basic fundaments of speech and video codification. Standards review	1.5	
14	27	Module 9: Other applications • Emerging applications				Session for emerging applications and Invited talks	1.5	7.5
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SUBTOTAL							42+105(**) = 147	
15-16		To finish the Technical Report						25
17-18		Evaluation					3	5
TOTAL HOURS							180	

(**) 105 hours of student course work as maximum in 14 weeks, considering 30 hours for ECTS credit.