



SUBJECT NAME: ADVANCED MULTIMEDIA SERVICES		
MASTER IN TELECOMMUNICATIONS ENGINEERING	COURSE: 1	SEMESTRE: 1

WEEKLY PLANNING							
WEEK	SESSION	CONTENT DESCRIPTION	Computer room	Session with 2 instructors)	WEEKLY STUDENT HOURS		
					DESCRIPTION	FACE-TO-FACE HOURS	TOTAL STUDENT TIME
1	1	Course presentation: Introduction to multimedia Communications.			Course presentation. Review of the basic concepts in a layered communication network architecture (link, network and transport levels with detailed information for TCP),	1,66	7
	2	Introduction to multimedia communications. RTP and RTCP.			Study of the document 'Media Communications' (Aula Global).	1,66	
2	3	C programming review			C programming review	1,66	7
	4	Programming of multimedia applications: sound card			Reading of RFC3550, RFC3551, RFC4961.	1,66	
3	5	Programming of multimedia applications: communications. Audio-conference software design			Programming techniques for multimedia applications.	1,66	7
	6	Introduction to the laboratory work.			Reading of lab specification documents and analysis of formulated requirements.	1,66	
4	7	First contact with the laboratory: tests with the sound card	Lab		Preparation of the lab: reading the specifications, reviewing the necessary tools, such as the calls used to program the sound card	1,66	7
	8	mplementation of RTP-based audio conferencing software	Lab		Analysis of the tools available in Aula Global for the development of the lab. Start Encoding: Capture arguments on the command line. Initial communication between participating nodes, sound card configuration, circular buffer configuration.	1,66	
5	9	Implementation of RTP-based audio conferencing software	Lab		Initial communication between participating nodes, sound card configuration, circular buffer configuration.	1,66	7
	10	Implementation of RTP-based audio conferencing software	Lab		Initial communication between participating nodes, sound card configuration, circular buffer configuration. RTP header configuration.	1,66	

6	11	Implementation of RTP-based audio conferencing software	Lab		Processing of RTP headers at reception. Accumulation of buffer data prior to reproduction.	1,66	7
	12	Implementation of RTP-based audio conferencing software	Lab		Basic functions of the main loop of data reception and circular buffering, extraction of circular buffer data and writing to sound card, recording data from the sound card and sending to the remote node.	1,66	
7	13	Implementation of RTP-based audio conferencing software	Lab		Treatment of lost and delayed packets	1,66	7
	14	Testing RTP-based audio conferencing software	Lab		Design and testing. Writing the memory	1,66	
8	15	Presentation of the second part of the course and introduction to the SIP Protocol			Presentation of the second part of the course and presentation SIP Protocol	1,66	7
	16	SIP Protocol			Review of RFCs on SIP and protocol use cases. Identification of message sequences. Understanding error situations, timers, and call routing decisions.	1,66	
9	17	Programming services on SIP			Programmatic environments for the development of services in SIP Proxys. Study of the SIP Servlets API.	1,66	7
	18	Programación de servicios de usuario en XML			Programming user services in XML	1,66	
10	19	APIs en Java para tratamiento de XML Evaluación parcial			Java APIs for handling XML Partial evaluation	1,66	7
	20	Implementing a SIP User Agent	Lab		Java implementation of a SIP user agent that is capable of sending and receiving certain preselected message sequences and validation through tests. Implementation of the SIP protocol based on an API already programmed for the parseo and composition of SIP messages. Call state machines for both caller and caller. Transactions. Timers. Treatment of packet loss.	1,66	
11	21	Implementing a SIP User Agent	Lab		Java implementation of a SIP user agent that is capable of sending and receiving certain preselected message sequences and validation through tests. User interface. Behavior multi-thread. Validation without Proxy.	1,66	7
	22	Implementing a SIP Proxy with Execute SIP Servlets	Lab		Java implementation of a SIP Proxy server that processes the call setup messages. Implementation of protocol, timers and state machines. Loose-routing behavior. User registration and valid user lists.	1,66	
12	23	Implementing a SIP Proxy with Execute SIP Servlets	Lab		Java implementation of a SIP Proxy server that processes the call setup messages. Validation of operation against packet loss. Debug mode.	1,66	7
	24	Implementing a SIP Proxy with Execute SIP Servlets	Lab		Provide the previous SIP Servlet with SIP Servlet container capabilities by implementing a simplified API. Dynamic class instantiation. Definition of call control based on caller, called and time of day.	1,66	

13	25	Implementing a Configurable SIP Servlet Container Using XML File	Lab		Implementation of a SIP Servlet container that will be deployed in the previous Proxy and will process the call establishment messages by using a user service configuration file in XML. The parsing of service files in XML will be implemented according to a simplified grammar that allows lists of valid and prohibited users as well as allowed and forbidden slots.	1,66	7
	26	Implementing a Configurable SIP Servlet Container Using XML File	Lab		Treatment of conflicts in the flow of call attention when both caller and caller have associated services. Testing and validation.	1,66	
14	27	SDP and Integration with SW RTP of the first part of the course	Lab		Introduction of the SDP payload in the SIP messages and use of the RTP SW of the first part of the subject to have a user agent with real communication capacity.	1,66	7
	28	SDP and Integration with SW RTP of the first part of the course	Lab		Testing and final validation. Validation of the quality of service, and parameters of quality in the establishment of call. Measures of call set times, audio delays.	1,66	
SUBTOTAL						46,5 + 51,5 (**)	= 98
15-16		Catch up sessions, tutorials, work delivery, etc.				0	
17-18		Assesment				0	
TOTAL						98 + 7 =	105

(**) 105 hours of work per student at most in 14 weeks, assuming 30 hours per ECTS credit.

SCHEDULE for the EXPERIMENTAL LABORATORIES (OR SESSIONS WITH 2 INSTRUCTORS) OUTSIDE THE REGULAR SCHEDULE *						
SESSI ON	WEEK	DESCRIPTION OF THE SESSION CONTENTS (The group is subdivided into two or the session is taught with two teachers outside regular hours).	LABORATORY IN WHICH SESSIONS ARE HELD	WORK OF THE STUDENT DURING THE WEEK		
				DESCRIPTION	FACE TO FACE HOURS	TOTAL NUMBER OF HOURS
1	9	Summative assessment of the RTP-based audio conferencing software	The same as the one used in the regular schedule	Preparation of the lab defense	1,66	3,5
2	9	Summative assessment of the RTP-based audio conferencing software	The same as the one used in the regular schedule	Preparation of the lab defense	1,66	
3	15	Laboratory assessment of implemented implementations	The same as the one used in the regular schedule	Preparation of the lab defense	1,66	3,5
4	15	Laboratory assessment of implemented implementations	The same as the one used in the regular schedule	Preparation of the lab defense	1,66	
TOTAL					7	

* The number of sessions can be extended to 6.