



COURSE: Audiovisual Services		
DEGREE: Bachelor in Sound and Image Engineering	YEAR: 4th	TERM: 1nd

WEEKLY PLANNING									
WEEK	SESSION	DESCRIPTION	GROUPS (mark X)		SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room)	Indicate YES/NO If the session needs 2 teachers	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS (Max. 7h week)
1	1	PART 1. Introduction <ul style="list-style-type: none"> Presentation of the course: syllabus and rules. 	X			NO	- Read texts associated with session 3.	1,66	7h
1	2	Introduction to the subject: audiovisual services <ul style="list-style-type: none"> Audiovisual services and distributed multimedia applications. Evolution of formats and coding. Multimedia transmission: network 		X		NO	<ul style="list-style-type: none"> Review the concepts acquired on session 2. Do activity to consolidate the acquired knowledge. Prepare laboratory exercise of session 4. 	1,66	

		requirements and architectures of protocols.							
2	3	<p>PART 2. Multicast routing service</p> <p>2.1 Basic concepts</p> <ul style="list-style-type: none"> Multiparty delivery: user applications, Unicast VS Multicast, problematic associated with the multicast service. Definition of multicast service, utilization of multicast in multimedia applications. <p>2.2. Addressing</p> <ul style="list-style-type: none"> Multicast addresses, IANA guidelines for multicast address assignments. Scope of multicast session. <p>2.3 Management of multicast groups</p> <ul style="list-style-type: none"> Protocol for multicast group management: IGMP versions 1, 2 and 3. 	X			NO	<ul style="list-style-type: none"> Review the concepts acquired on session 3. Solve questions on basic concepts, addressing and management of multicast groups, corresponding to the activity to consolidate the acquired knowledge. Read texts associated with session 5. 	1,66	
2	4	<ul style="list-style-type: none"> Study cases: multicast over local area networks (LAN) and ethernet networks. Laboratory exercise: use of Wireshark and multicast-based multimedia application, capture of multicast packets and IGMP, analysis of operation of the IGMP protocol. Deliverable: Consolidation of acquired knowledge (part 1). 		X	4.1B01 or 4.1.B02	YES	<ul style="list-style-type: none"> Review the concepts acquired on session 4. Prepare the study cases of session 6. 	1,66	7h
3	5	<p>2.4 Multicast routing protocols</p> <ul style="list-style-type: none"> Basic concepts about routing, unicast routing (distance vector, link state). Techniques and protocols for multicast routing (part I): flooding, spanning trees, Reverse Path 	X			NO	<ul style="list-style-type: none"> Review the concepts acquired on session 5. Solve questions on multicast routing protocols (part 1), corresponding to the activity to consolidate the acquired knowledge. Read texts associated with session 7. 	1,66	7h

		Broadcasting.							
3	6	<ul style="list-style-type: none"> Study cases about multicast routing. Deliverable: study cases of session 6. Evaluation questionnaire: laboratory exercise of session 4. 		X			NO	<ul style="list-style-type: none"> Review the concepts acquired on session 6. Prepare the study cases of session 8. 	1,66
4	7	<ul style="list-style-type: none"> Techniques and protocols for multicast routing (part II): Reverse Path Multicasting (DVRMP, PIM-DM), Forward Path Multicasting (MOSPF), shared tree techniques (CBT, PIM-SM). 	X				NO	<ul style="list-style-type: none"> Review the concepts acquired on session 7. Complete the activity to consolidate the acquired knowledge. Work to be defined depending on course development. 	1,66
4	8	<ul style="list-style-type: none"> Study cases about multicast routing. Deliverable: study cases of session 8. 		X			NO	<ul style="list-style-type: none"> Review the concepts acquired on session 8. Consolidation of acquired knowledge. Work to be defined depending on course development. 	1,66
5	9	<ul style="list-style-type: none"> Expansion: Work to be defined depending on course development Study case: IP television in operator networks. Deliverable: Consolidation of acquired knowledge (part 2). 	X				NO	<ul style="list-style-type: none"> Review the concepts acquired on session 9. Read texts associated with session 11. 	1,66
5	10	Knowledge test		X			NO	<ul style="list-style-type: none"> Self-evaluation: resolution of doubts after the knowledge test. Prepare practical study case of session 12. 	1,66
6	11	<p>PART 3. Multimedia transport protocols over packet networks</p> <p>3.1 RTP</p> <ul style="list-style-type: none"> Provided services. RTP session. 	X				NO	<ul style="list-style-type: none"> Review the concepts acquired on session 11. Solve questions on RTP corresponding to the activity to consolidate the acquired knowledge. Read texts associated with sessions 13 and 29. 	1,66
									7h
									7h

		<ul style="list-style-type: none"> • Structure of an RTP packet, sequence number and timestamp. • Reconstruction of video/audio sequence at the receiver. • Identification of an RTP source. • RTP relays: mixers and translators. • Congestion control. 							
6	12	<ul style="list-style-type: none"> • Practical study case about RTP: provided services and packet structure. 		X	4.1.B01 or 4.1.B02	NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 12. Review the implementation of the practical study case. - Prepare study cases of session 14. 	1,66	
7	13	<p>3.2 RTCP</p> <ul style="list-style-type: none"> • Provided services. • Types and structure of RTCP packets: RR (Receiver Report), SR (Sender Report), SDES (Source Description), BYE, APP (Application-Defined). • Jitter and Round Trip Time calculation. • Sending of RTCP packets: compound packet. • RTCP transmission interval. 	X			NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 13. - Solve questions on RTCP corresponding to the activity to consolidate the acquired knowledge. - Read texts associated with session 15. 	1,66	
7	14	<ul style="list-style-type: none"> • Study cases about RTP/RTCP: provided services, structure of RTP/RTCP packets and RTP relays. • Deliverable: study cases of session 14. 		X		NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 14. - Prepare practical study case of session 16. 	1,66	7h
8	15	<p>PART 5. Services based on multimedia streaming</p> <ul style="list-style-type: none"> • Alternatives of implementation for streaming stored audio/video (UDP streaming and RTSP, HTTP streaming, DASH). 	X			NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 15. - Complete the activity to consolidate the acquired knowledge. - Work to be defined depending on course development 	1,66	7h

		<ul style="list-style-type: none"> Architectures for the scalable distribution of multimedia content: CDN. Study cases: Netflix and YouTube. 							
8	16	<ul style="list-style-type: none"> Practical study case about services based on multimedia streaming: RTSP. 		X	4.1.B01 or 4.1.B02	NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 16. Review the implementation of the practical study case. - Consolidation of acquired knowledge. - Work to be defined depending on course development. 	1,66	
9	17	<ul style="list-style-type: none"> Expansion: Work to be defined depending on course development. Deliverable: Consolidation of acquired knowledge (parts 3, 4, and 5). 	X			NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 17. - Read texts associated with session 19. 	1,66	
9	18	<u>Knowledge test</u>		X		NO	<ul style="list-style-type: none"> - Self-evaluation: resolution of doubts after the knowledge test - Prepare laboratory exercise of sessions 20, 22 and 24.. 	1,66	7h
10	19	<p>PART 6. Signaling of multimedia services over packet networks</p> <p>6.1 Introduction</p> <ul style="list-style-type: none"> Signaling architectures of the voice service in circuit-switched networks (SS7 Signaling System) and packets networks (H.323 and SIP). <p>6.2 SIP</p> <ul style="list-style-type: none"> Provided services. User identification. SIP elements: User Agents (UA), servers (Registrar, Redirect, Proxy) and B2BUA. 	X			NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 19. - Solve questions on signaling architectures and SIP corresponding to the activity to consolidate the acquired knowledge. - Read texts associated with session 21. 	1,66	7h

10	20	<ul style="list-style-type: none"> • Laboratory exercise: configuration and analysis of operation of a SIP-based VoIP service (part 1). 		X	4.1B01 or 4.1.B02	YES	<ul style="list-style-type: none"> - Review the concepts acquired on session 20. - Prepare laboratory exercise of sessions 22 and 24. 	1,66	
11	21	<ul style="list-style-type: none"> • SIP messages: format, requests and responses. • SIP messages: header fields. • SIP messages: message body. • SIP signaling: registration. 	X			NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 21. - Solve questions on SIP messages and registration corresponding to the activity to consolidate the acquired knowledge. - Read texts associated with session 23. 	1,66	
11	22	<ul style="list-style-type: none"> • Laboratory exercise: configuration and analysis of operation of a SIP-based VoIP service (part 2). 		X	4.1B01 or 4.1.B02	YES	<ul style="list-style-type: none"> - Review the concepts acquired on sessions 20 and 22. - Prepare laboratory exercise of session 24. 	1,66	
12	23	<ul style="list-style-type: none"> • SIP signaling: session establishment. • SIP signaling: session termination. • SIP signaling: session modification. <p>6.3 SDP</p> <ul style="list-style-type: none"> • Provided services. • Offer/Answer model of SDP. 	X			NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 23. - Solve questions on SIP session establishment, modification, and termination, as well as on SDP, corresponding to the activity to consolidate the acquired knowledge. - Read texts associated with session 25. 	1,66	7h
12	24	<ul style="list-style-type: none"> • Laboratory exercise: configuration and analysis of operation of a SIP-based VoIP service (part 3). • Evaluation questionnaire: laboratory exercise of sessions 20, 22 and 24. 		X	4.1B01 or 4.1.B02	YES	<ul style="list-style-type: none"> - Review the concepts acquired on sessions 20, 22 and 24. - Prepare study cases of session 26. 	1,66	7h
13	25	<ul style="list-style-type: none"> • SDP session description: analysis of examples. • SIP extensions. • Conference service in SIP. • Voice services in operator networks: the IP Multimedia Subsystem (IMS). • Signaling solutions for IP television and for streaming stored audio/video services. 	X			NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 25. - Complete the activity to consolidate the acquired knowledge. - Work to be defined depending on course development. 	1,66	7h

13	26	<ul style="list-style-type: none"> Study cases about signaling of multimedia services over packet networks. <u>Deliverable: study cases of session 26.</u> 		X			NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 26. - Consolidation of acquired knowledge. - Work to be defined depending on course development. 	1,66	
14	27	<ul style="list-style-type: none"> Expansion: Work to be defined depending on course development. <u>Deliverable:</u> Consolidation of acquired knowledge (part 5). 	X				NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 27. 	1,66	
14	28	<u>Knowledge test</u>		X			NO	<ul style="list-style-type: none"> - Self-evaluation: resolution of doubts after the knowledge test 	1,66	2h
7	29	<p>PART 4. QoS architectures in packet networks</p> <ul style="list-style-type: none"> Tutorial orientation, with questions and exercises. Basic concepts: QoS (Quality of Service), network congestion, classical techniques for congestion control. Scheduling techniques (FCFS, PQ, RR, WFQ, EDF), buffer management (EPD, RED, FRED, WRED), policing mechanisms and traffic characterization (token bucket), Differentiated services (Diffserv). Integrated services (RSVP). 		X	4.1.B01 or 4.1.B02		NO	<ul style="list-style-type: none"> - Review the concepts acquired on session 29. 	1,66	
Subtotal 1									48,33	93
Total 1 (<i>Hours of class plus student homework hours between weeks 1-14</i>)									141,33	

15		Tutorials, handing in, etc									
16		Assessment									
17									0		
18											
								Subtotal 2	0		
								Total 2 (<i>Hours of class plus student homework hours between weeks 15-18</i>)		0	
								TOTAL (<i>Total 1 + Total 2. Maximum 180 hours</i>)		141,33	