Universidad Carlos III de Madrid
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COURSE: Audiovisual Services		
DEGREE: Bachelor in Audiovisual System 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** • Presentation of the course: syllabus and rules.	X			NO	- Read texts associated with session number 3. - Solving questions about basic concepts, addressing and management of multicast groups, from the aggregated group preparation brochure.	1,6	
1	2	***Introduction to the subject: audiovisual services*** • Audiovisual services and distributed multimedia applications. • Evolution of formats and coding. • Multimedia transmission: network		X		NO	- Review the concepts acquired on session 2. - Read texts associated with session number 4. - Prepare lab exercise of session 4.	1,6	7h

		requirements and architectures of protocols.							
2	3	**PART 2. Multicast routing service** ***2.1 Basic concepts*** • Multiparty delivery: user applications, Unicast VS Multicast, problematic associated with the multicast service. • Definition of multicast service, utilization of multicast in multimedia applications. ***2.2. Addressing*** • Multicast addresses, IANA guidelines for multicast address assignments. • Scope of multicast session. ***2.3 Management of multicast groups*** • Protocol for multicast group management: IGMP versions 1, 2 and 3.	X			NO	- Review the concepts acquired on session 3. - Read texts associated with session number 5. - Solving questions about multicast routing protocols (part I), addressing and management of multicast groups, from the aggregated group preparation brochure.	1,6	
2	4	• Study cases: multicast over local area networks (LAN) and ethernet networks. • **Lab exercise**: use of Wireshark and a multicast-based multimedia application, capture of multicast packets and IGMP, analysis of operation of the IGMP protocol. • **Deliverable**: concept map (part 1).		X	4.1B01 or 4.1.B02	YES	- Review the concepts acquired on session 4. - Prepare session 6 study case.	1,6	7h
3	5	***2.4 Multicast routing protocols*** • Basic concepts about routing, unicast routing (distance vector, link state). • Techniques and protocols for multicast routing (part I): flooding, spanning trees, Reverse Path Broadcasting.	X			NO	- Review the concepts acquired on session 5. - Read texts associated with session number 7. - Solving questions about multicast routing protocols (part II), from the aggregated group preparation brochure.	1,6	7h

3	6	• Study cases about multicast routing. • **Deliverable**. • **Evaluation of the lab exercise corresponding to session 4.**		X		NO	- Review the concepts acquired on session 6. - Prepare session 8 study cases (from the study case brochure).	1,6	
4	7	• 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	- Review the concepts acquired on session 7. - Work to be defined depending on course development. Consolidation of acquired knowledge.	1,6	
4	8	• Study cases about multicast routing. • **Deliverable.**		X		NO	- Review the concepts acquired on session 8. - Work to be defined depending on course development. Consolidation of acquired knowledge.	1,6	7h
5	9	**PART 3. QoS architectures in packet networks** • Basic concepts: QoS (Quality of Service), network congestion, classical techniques for congestion control. • Integrated services (RSVP): traffic characterization (token bucket), scheduling techniques (FCFS, PQ, CBQ, WFQ, EDF), buffer management (EPD, RED, FRED, WRED). • Differentiated services. **Review activities** **Deliverable**: concept map (part 2).	X			NO	- Review the concepts acquired on session 9. - Read texts associated with session number 11. - Solving questions about RTP from the aggregated group preparation brochure.	1,6	
5	10						- Self-evaluation: review of the knowledge test and solve of doubts	1,6	7h

		Knowledge test		X		NO	- Prepare session 12 and 29 study cases (from the study case brochure).		
6	11	**PART 4. Multimedia transport protocols over packet networks** ***4.1 RTP*** • Provided services. • RTP session. • Structure of an RTP packet, sequence Lumber and timestamp. • Reconstruction of video/audio sequence at the receiver. • Identification of an RTP source. • RTP relays: mixers and translators. • Congestion control.	X			NO	- Review the concepts acquired on session 11. - Read texts associated with session number 13. - Solving questions about RTCP from the aggregated group preparation brochure.	1,6	
6	12	• Study cases about RTP/RTCP: provided services, structure of RTP/RTCP packets and RTP relays. • **Deliverable.**		X		NO	- Review the concepts acquired on session 12. - Prepare session 14 study cases (from the study case brochure).	1,6	7h
7	13	***4.2 RTCP*** • 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 transmisión interval. **Deliverable**: concept map (part 3).	X			NO	- Review the concepts acquired on session 13. - Read texts associated with session number 15. - Solving questions about services based on multimedia streaming ,from the aggregated group preparation brochure.	1,6	
7	14						- Review the concepts acquired on session 14.	1,6	7h

		• Study cases about RTP/RTCP: provided services, structure of RTP/RTCP packets and RTP relays. • **Deliverable.**		X		NO	- Prepare session 16 study cases (from the study case brochure).		
8	15	**PART 5. Services based on multimedia streaming** • Alternatives of implementation for streaming stored Audio/Video (web server, streaming server, RTSP, DASH) and IP Television. • Architectures for distribution of multimedia content: CDN and P2P.	X			NO	- Review the concepts acquired on session 15. - Work to be defined depending on course development. Consolidation of acquired knowledge.	1,6	
8	16	• Study case about services based on multimedia streaming: RTSP.		X	4.1.B01 or 4.1.B02	NO	- Review the concepts acquired on session 16. - Work to be defined depending on course development. Consolidation of acquired knowledge.	1,6	7h
9	17	Expansion **Deliverable**: concept maps (part 4 and 5).	X			NO	- Read texts associated with session number 19. - Solving questions about services, identification, and elements in SIP, from the aggregated group preparation brochure.	1,6	
9	18	**Knowledge test**		X		NO	- Self-evaluation: review of the knowledge test and solve of doubts - Prepare lab exercise of session 20.	1,6	7h
10	19	**PART 6. Signaling of multimedia services over packet networks** ***6.1 Introduction*** • Signaling architectures of the voice service in	X			NO	- Review the concepts acquired on session 19. - Read texts associated with session number 21. - Solving questions about messages and registration in SIP, from the aggregated group preparation brochure.	1,6	7h

		circuit-switched networks (SS7 Signaling System) and packets networks (H.323 and SIP). ***6.2 SIP*** • Provided services. • User identification. • SIP elements: User Agents (UA), servers (Registrar, Redirect, Proxy) and B2BUA.							
10	20	• **<u>Lab exercise</u>**: configuration and analysis of operation of a SIP-based VoIP service.		X	4.1B01 or 4.1.B02	YES	- Review the concepts acquired on session 20. - Prepare lab exercise of session 22.	1,6	
11	21	• SIP messages: format, requests and responses. • SIP messages: header fields. • SIP messages: message body. • SIP signaling: registration.	X			NO	- Review the concepts acquired on session 21. - Read texts associated with session number 23. - Solving questions about SIP session establishment, modification, and termination, as well as about SDP, from the aggregated group preparation brochure.	1,6	
11	22	• **<u>Lab exercise</u>**: configuration and analysis of operation of a SIP-based VoIP service (part II).		X	4.1B01 or 4.1.B02	YES	- Review the concepts acquired on session 22. - Prepare lab exercise of session 24.	1,6	7h
12	23	• SIP signaling: session establishment. • SIP signaling: session termination. • SIP signaling: session modification. ***6.3 SDP*** • Provided services. • SDP session description: analysis of examples. • Offer/Answer model of SDP.	X			NO	- Review the concepts acquired on session 23. - Read texts associated with session number 25. - Solving questions about SIP extensions, SIP conference and H.323 from the aggregated group preparation brochure.	1,6	
12	24	• **<u>Lab exercise</u>**: configuration and analysis of operation of a SIP-based VoIP service (part III). • **<u>Evaluation of the lab exercise corresponding to sessions 20, 22 and 24.</u>**		X	4.1B01 or 4.1.B02	YES	- Review the concepts acquired on session 24. - Prepare session 26 study cases (from the study case brochure)	1,6	7h

13	25	• SIP extensions. • Conference service in SIP. ***6.4 H.323*** • Provided services. • H.323 architecture and elements. • Protocols: RAS signaling and call signaling (H.225.0), control signaling (H.245). • Examples of operation.	X			NO	- Review the concepts acquired on session 25. - Work to be defined depending on course development. Consolidation of acquired knowledge.	1,6	
13	26	• Study cases about signaling of multimedia services over packet networks: SIP and H.323. • **Deliverable.**		X		NO	- Review the concepts acquired on session 26. - Work to be defined depending on course development. Consolidation of acquired knowledge.	1,6	7h
14	27	Expansion **Deliverable**: concept map (part 6).	X			NO		1,6	
14	28	**Knowledge test**		X		NO	- Self-evaluation: review of the knowledge test and solve of doubts	1,6	2h
6	29	• Study case about RTP: provided services and packet structure.		X	4.1.B01 or 4.1.B02	NO	- Review the concepts acquired on session 29.	1,6	
							Subtotal 1	**48,33**	**93**
							Total 1 *(Hours of class plus student homework hours between weeks 1-14)*		

15		Tutorials, handing in, etc							
16		Assessment						0	
17									
18									
							Subtotal 2	**0**	
							Total 2 *(Hours of class plus student homework hours between weeks 15-18)*	0	

TOTAL *(Total 1 + Total 2. Maximum 180 hours)*	**141,33**