



<b>COURSE: Audiovisual Services</b>		
<b>DEGREE: Bachelor in Telematics Engineering</b>	<b>YEAR: 4<sup>th</sup></b>	<b>TERM: 1<sup>nd</sup></b>

WEEKLY PLANNING									
W EE	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	<b>PART 1. Introduction</b> <ul style="list-style-type: none"> <li>Presentation of the course: syllabus and rules.</li> <li>Presentation of the practical study case to be done during the course.</li> </ul>	X			NO	<ul style="list-style-type: none"> <li>Read texts associated with session number 3.</li> <li>Solving questions about basic concepts, addressing and management of multicast groups, from the aggregated group preparation brochure.</li> </ul>	1,6	7h
1	2	<b>Introduction to the subject: audiovisual services</b> <ul style="list-style-type: none"> <li>Audiovisual services and distributed multimedia applications.</li> <li>Evolution of formats and coding.</li> </ul>					<ul style="list-style-type: none"> <li>Review the concepts acquired on session 2.</li> <li>Read texts associated with session number 4.</li> <li>Prepare lab exercise of session 4.</li> </ul>	1,6	

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

		Broadcasting.							
3	6	<ul style="list-style-type: none"> <li>Study cases about multicast routing.</li> <li><b>Deliverable.</b></li> <li><u>Evaluation of the lab exercise corresponding to session 4.</u></li> </ul>		X			NO	<ul style="list-style-type: none"> <li>Review the concepts acquired on session 6.</li> <li>Prepare session 8 study cases (from the study case brochure).</li> </ul>	1,6
4	7	<ul style="list-style-type: none"> <li>Techniques and protocols for multicast routing (part II): Reverse Path Multicasting (DVRMP, PIM-DM), Forward Path Multicasting (MOSPF), shared tree techniques (CBT, PIM-SM).</li> </ul>	X				NO	<ul style="list-style-type: none"> <li>Review the concepts acquired on session 7.</li> <li>Work to be defined depending on course development. Consolidation of acquired knowledge.</li> </ul>	1,6
4	8	<ul style="list-style-type: none"> <li>Study cases about multicast routing.</li> <li><b>Deliverable.</b></li> </ul>		X			NO	<ul style="list-style-type: none"> <li>Review the concepts acquired on session 8.</li> <li>Work to be defined depending on course development. Consolidation of acquired knowledge.</li> </ul>	1,6
5	9	Expansion	X				NO	<ul style="list-style-type: none"> <li>Read texts associated with session number 11.</li> <li>Solving questions about RTP from the aggregated group preparation brochure.</li> </ul>	1,6
5	10	<u>Knowledge test</u>		X			NO	<ul style="list-style-type: none"> <li>Self-evaluation: review of the knowledge test and solve of doubts</li> <li>Prepare practical study case of session 12.</li> </ul>	1,6
6	11	<p><b>PART 3. Multimedia transport protocols over packet networks</b></p> <p><b>3.1 RTP</b></p> <ul style="list-style-type: none"> <li>Provided services.</li> <li>RTP session.</li> <li>Structure of an RTP packet, sequence Lumber and timestamp.</li> <li>Reconstruction of video/audio sequence at the</li> </ul>	X				NO	<ul style="list-style-type: none"> <li>Review the concepts acquired on session 11.</li> <li>Read texts associated with session number 13.</li> <li>Solving questions about RTCP from the aggregated group preparation brochure.</li> </ul>	1,6

		<ul style="list-style-type: none"> <li>receiver.</li> <li>Identification of an RTP source.</li> <li>RTP relays: mixers and translators.</li> <li>Congestion control.</li> </ul>								
6	12	<ul style="list-style-type: none"> <li>Practical study case (part 1): RTP.</li> </ul>		X			NO	<ul style="list-style-type: none"> <li>- Review the concepts acquired on session 12. Review the implementation of the practical study case.</li> <li>- Prepare session 14 study cases (from the study case brochure).</li> </ul>	1,6	
7	13	<p><b>3.2 RTCP</b></p> <ul style="list-style-type: none"> <li>Provided services.</li> <li>Types and structure of RTCP packets: RR (Receiver Report), SR (Sender Report), SDES (Source Description), BYE, APP (Application-Defined).</li> <li>Jitter and Round Trip Time calculation.</li> <li>Sending of RTCP packets: compound packet.</li> <li>RTCP transmission interval.</li> </ul>	X				NO	<ul style="list-style-type: none"> <li>- Review the concepts acquired on session 13.</li> <li>- Read texts associated with session number 15.</li> <li>- Solving questions about services based on multimedia streaming ,from the aggregated group preparation brochure.</li> </ul>	1,6	
7	14	<ul style="list-style-type: none"> <li>Study cases about RTP/RTCP: provided services, structure of RTP/RTCP packets and RTP relays.</li> <li><b><u>Deliverable.</u></b></li> </ul>		X			NO	<ul style="list-style-type: none"> <li>- Review the concepts acquired on session 14.</li> <li>- Prepare practical study case of session 16.</li> </ul>	1,6	7h
8	15	<p><b>PART 4. Services based on multimedia streaming</b></p> <ul style="list-style-type: none"> <li>Alternatives of implementation for streaming stored Audio/Video (web server, streaming server, RTSP, DASH) and IP Television.</li> <li>Architectures for distribution of multimedia content: CDN and P2P.</li> </ul>	X				NO	<ul style="list-style-type: none"> <li>- Review the concepts acquired on session 15.</li> <li>- Work to be defined depending on course development. Consolidation of acquired knowledge.</li> </ul>	1,6	7h

8	16	Practical study case (part 2): RTSP.		X	4.1.B01 or 4.1.B02	NO	- Review the concepts acquired on session 16. Review the implementation of the practical study case. - Work to be defined depending on course development. Consolidation of acquired knowledge.	1,6	
9	17	Expansion	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	<u>Knowledge test</u>		X		NO	- Self-evaluation: review of the knowledge test and solve of doubts - Prepare lab exercise of sessions 20 and 22.	1,6	7h
10	19	<p><b>PART 5. Signaling of multimedia services over packet networks</b></p> <p><b>5.1 Introduction</b></p> <ul style="list-style-type: none"> <li>• Signaling architectures of the voice service in circuit-switched networks (SS7 Signaling System) and packets networks (H.323 and SIP).</li> </ul> <p><b>5.2 SIP</b></p> <ul style="list-style-type: none"> <li>• Provided services.</li> <li>• User identification.</li> <li>• SIP elements: User Agents (UA), servers (Registrar, Redirect, Proxy) and B2BUA.</li> </ul>	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	
10	20	<ul style="list-style-type: none"> <li>• <b>Lab exercise:</b> configuration and analysis of operation of a SIP-based VoIP service (part 1).</li> </ul>		X	4.1.B01 or 4.1.B02	YES	- Review the concepts acquired on session 20. - Prepare lab exercise of sessions 20 and 22.	1,6	7h
11	21	<ul style="list-style-type: none"> <li>• SIP messages: format, requests and responses.</li> </ul>					- Review the concepts acquired on session 21.	1,6	7h

		<ul style="list-style-type: none"> <li>SIP messages: header fields.</li> <li>SIP messages: message body.</li> <li>SIP signaling: registration.</li> </ul>	X			NO	<ul style="list-style-type: none"> <li>Read texts associated with session number 23.</li> <li>Solving questions about SIP session establishment, modification, and termination, as well as about SDP, from the aggregated group preparation brochure.</li> </ul>		
11	22	<ul style="list-style-type: none"> <li><b>Lab exercise:</b> configuration and analysis of operation of a SIP-based VoIP service (part 2).</li> <li><b>Evaluation of the lab exercise corresponding to sessions 20 and 22.</b></li> </ul>		X	4.1B01 or 4.1.B02	YES	<ul style="list-style-type: none"> <li>Review the concepts acquired on session 22.</li> <li>Prepare practical study case of sessions 24 and 29.</li> </ul>	1,6	
12	23	<ul style="list-style-type: none"> <li>SIP signaling: session establishment.</li> <li>SIP signaling: session termination.</li> <li>SIP signaling: session modification.</li> </ul> <p><b>5.3 SDP</b></p> <ul style="list-style-type: none"> <li>Provided services.</li> <li>SDP session description: analysis of examples.</li> <li>Offer/Answer model of SDP.</li> </ul>	X			NO	<ul style="list-style-type: none"> <li>Review the concepts acquired on session 23.</li> <li>Read texts associated with session number 25.</li> <li>Solving questions about SIP extensions, SIP conference and H.323 from the aggregated group preparation brochure.</li> </ul>	1,6	
12	24	<ul style="list-style-type: none"> <li>Practical study case (part 3): SIP.</li> </ul>		X	4.1B01 or 4.1.B02	YES	<ul style="list-style-type: none"> <li>Review the concepts acquired on session 24. Review the implementation of the practical study case.</li> <li>Prepare session 26 study cases (from the study case brochure).</li> </ul>	1,6	7h
13	25	<ul style="list-style-type: none"> <li>SIP extensions.</li> <li>Conference service in SIP.</li> </ul> <p><b>5.4 H.323</b></p> <ul style="list-style-type: none"> <li>Provided services.</li> <li>H.323 architecture and elements.</li> <li>Protocols: RAS signaling and call signaling (H.225.0), control signaling (H.245).</li> <li>Examples of operation.</li> </ul>	X			NO	<ul style="list-style-type: none"> <li>Review the concepts acquired on session 25.</li> <li>Work to be defined depending on course development. Consolidation of acquired knowledge.</li> </ul>	1,6	7h

13	26	<ul style="list-style-type: none"> <li>Study cases about signaling of multimedia services over packet networks: SIP and H.323.</li> <li><b>Deliverable.</b></li> </ul>		X		NO	<ul style="list-style-type: none"> <li>- Review the concepts acquired on session 26.</li> <li>- Work to be defined depending on course development. Consolidation of acquired knowledge.</li> </ul>	1,6	
14	27	Expansion	X			NO		1,6	
14	28	<b>Knowledge test</b>		X		NO	- Self-evaluation: review of the knowledge test and solve of doubts	1,6	2h
12	29	<ul style="list-style-type: none"> <li>Practical study case (part 4): integration tests and extensions.</li> </ul>		X	4.1.B01 or 4.1.B02	NO	- Review the concepts acquired on session 29. Review the implementation of the practical study case.	1,6	
<b>Subtotal 1</b>								<b>46,67</b>	<b>93</b>
<b>Total 1</b> (Hours of class plus student homework hours between weeks 1-14)									

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

<b>TOTAL</b> (Total 1 + Total 2. Maximum 180 hours)								<b>139,67</b>	
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