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DENOMINACIÓN ASIGNATURA: Communication Networks and Services		
Degree: TELEMATICS ENGINEERING	YEAR: 2nd	TERM: 2nd

WEEKLY PLANNING								
WEEK	SESSION	DESCRIPTION OF THE SESSION CONTENT	GROUPS		Special room for session (computer classroom, audiovisual classroom, etc)	Mark YES/NO if it is a session with two professors	WEEKLY PROGRAMMING FOR STUDENT		
			LECTU0RE	SEMINAR			DESCRIPTION (*)	CLASS HOURS	HOMEWORK HOURS (Max. 7h week)
1	1	PART 1. INTRODUCTION • Course introduction • Communications, packet switching, circuit switching [sections 1.3.1-1.3.2, (pp. 51-60; pp. 23-32; pp. 48-57)] • Protocol definition, protocol stack [section 1.1.3, ,(pp. 33-35; pp. 7-9; pp. 33-35)); section 1.5, (pp. 74-82; pp. 46-53; pp. 73-81)]	X			No	• Study concepts acquired on session 1 • Read texts associated with session number 2 (**) • Solving session 2 questions from the preparation brochure	1,66	5h

1	2	• What is the Internet? Internet structure, standardization in the Internet [sections 1.1.1, 1.1.2, (pp. 28-33; pp. 2-6; pp. 28-33)] • Internet access networks [section 1.2, (pp. 35-40; pp. 9-13; pp. 35-44) rest of the section is recommended reading] • ISPs, Internet backbone (tier-x, ISP), peer and transit, providers-clients [section 1.3.3, (pp. 60-62; pp. 32-34; pp. 58-61)]		X			No	• Study concepts acquired on session 2 • Read texts associated with session number 3 (**) • Prepare session 3 study cases from the study case brochure	1,66	
2	3	**PART 2. NETWORK LAYER** **1. Basic network layer concepts** • Network layer functions, forwarding&routing, routers-packet switches, connection establishment, service models [section 4.1, , (pp. 342-349; pp. 300-306; pp. 332-339)] • Router simplified model [introduction to section 4.3, (pp. 356-358; pp. 312-314; pp. 346-348)].] • Packet transfer: delays (processing, queuing, transmission and propagation); packet loss, throughput [section 1.4, (pp. 62-74; pp. 34-45; pp. 61-73)]		X			No	• Study concepts acquired on session 3 • Read texts associated with session number 4 (**) • Solving session 4 questions from the preparation brochure	1,66	7h

2	4	**2. IP introduction** • Basic functions: header, functions, fragmentation and assembly [Introduction to section 4.4 and section 4.4.1, (pp. 367-374; pp. 323-329; pp. 357-364)] • ICMP [section 4.4.3, pg. 389-391]		X		No	• Study concepts acquired on session 4 • Read texts associated with session number 5 (**) • Solving session 5 questions from the preparation brochure	1,66	
3	5	**3. IP addressing** • IPv4 addresses: subnets, masks, CIDR [sections 4.4.2, (pp. 374-380; pp. 329-333; pp. 364-370)] • IP addressing use cases: IP address plan	X			No	• Study concepts acquired on session 5 • Prepare the lab exercise proposed for session 6	1,66	7h
3	6	• Lab. Practice: Wireshark, IP packet capture, IP header study, ICMP packet capture (ping, traceroute)		X		No	• Study concepts acquired on session 6 • Read texts associated with session number 7 (**) • Solving session 7 questions from the preparation brochure	1,66	

4	7	• IPv4 addresses: address aggregation and address plan, (CIDR, IANA, ICANN, RIRs], DHCP, NAT [[pp. 381-388; pp. 333-342; pp. 371-378)] **4. IP operation** • IP over Ethernet, ARP, host connection to an IP network [section 5.4.2, Sección 5.4.2, (pp. 497-501; pp. 445-450; pp. 491-495, part of section 5.4.1)]	17-02 (4.0E03)			No	• Study concepts acquired on session 7 • Read texts associated with session number 8 (**) • Solving session 8 questions from the preparation brochure	1,66	7h
4	8	• IP addressing, ARP, IP fragmentation, Forwarding Tables use cases.		X		No	• Study concepts acquired on session 8 • Read texts associated with session number 9(**) • Solving session 9 questions from the preparation brochure	1,66	
5	9	**5. IPv6** • IPv6 Header • IPv6 Addressing	X			No	• Study concepts acquired on session 9 • Prepare the lab exercise proposed for session 10	1,66	7h
5	10	• Lab. Exercise: IP over Ethernet, ARP, Wireshark		X		Yes (2)	• Study concepts acquired on session 10 • Read texts associated with session number 11 (**) • Solving session 11 questions from the preparation brochure	1,66	

6	11	• IPv6: Neighbor discovery	X			No	• Study concepts acquired on session 11 • Solving session 12 questions from the preparation brochure • Prepare 1st knowledge test	1,66	
6	12	• IPv4 and IPv6 addressing plan, and IP-to-MAC address resolution use cases • **First Knowledge Test: S01-S08**		X		Yes(2)	• Study concepts acquired on session 12 • Read texts associated with session number 13 (**) • Solving session 13 questions from the preparation brochure	1,66	7h
7	13	**5. Network routing** • Routing protocols: general ideas (protocol-algorithm, unicast-musticast, centralized-distributed, static-dynamic, hierarchy), • Link state routing protocol (Dijkstra algorithm) [introduction to section 4.5, section 4.5.1, (pp. 400-406; pp. 353-360; pp. 389-397), and introduction to section 4.7, (pp. 433; pp. 384; pp. 425)]	X			No	• Study concepts acquired on session 13 • Prepare the lab exercise proposed for session 14	1,66	
7	14	• Lab. Exercise: IPv6 configuration		X		No	• Study concepts acquired on session 14 • Read texts associated with session number 15 (**) • Solving session 15 questions from the preparation brochure	1,66	7h

8	15	**6. Routing in the Internet** • Distance vector routing protocols (based on Bellman-Ford) [section 4.5.2, (pp. 407-415; pp. 360-367; pp. 397-405)) • Inter-domain and intra-domain routing [section 4.5.3, (pp. 415-419; pp. 367-371; pp. 405-409) • Intra-domain routing: RIP [section 4.6.1, (pp. 420-424; pp. 371-375; pp. 410-414)]	X			No	• Study concepts acquired on session 15 • Prepare the lab exercise proposed for session 16+29	1,66	7h
8	16 + 29	• Lab. Exercise: routers configuration and operation (1st part)		X		Yes (2)	• Study concepts acquired on session 16+19 • Read texts associated with session number 17 (**) • Solving session 17 questions from the preparation brochure	1,66	
9	17	• Routing usecases: Dijikstra, Bellman-Ford and RIP	X			No	• Prepare Second Knowledge Test	1,66	7h
9	18	• **Second Knowledge Test: S01-S17**		X		No	• Read texts associated with session number 19 • Solving session 19 questions from the preparation brochure	1,66	

9	19	**PART 3. TRANSPORT LAYER** **1. Basic concepts** • Transport layer principles (end-to-end) [section 3.1, (pp. 224-229; pp. 186-190; pp. 212-217)] • Multiplexing and demultiplexing (ports, well-known ports, client-server model) [section 3.2, (pp. 229-236; pp. 190-197; pp. 217-224)].] **2. UDP** Service, segment structure, checksum calculation [section 3.3, (pp. 236-242; pp. 198-203; pp. 224-230)]	X			No	• Study concepts acquired on session 19 • Prepare lab knowledge test	1,66	7h
10	20	• **Lab Knowledge Test**		X		No	• Read texts associated with session number 21 • Solving session 21 questions from the preparation brochure	1,66	
11	21	**3. TCP** • Connection establishment [section 3.5.1, (pp. 268-271; pp. 228-231; pp. 256-259)] • Segment structure, sequence number and confirmations [section 3.5.2, (pp. 271-276; pp. 231-236; pp. 259-264)] • Reliable data transfer [section 3.5.4, (pp. 280-288; pp. 239-246; pp. 268-276)]	X			No	• Study concepts acquired on session 21 • Read texts associated with session number 22 • Solving session 22 questions from the preparation brochure	1,66	7h

11	22	• RTT estimation and retransmission timers [section 3.5.3, (pp. 276-279; pp. 236-239; pp. 264-267)] • Study cases of TCP operation		X		No	• Study concepts acquired on session 22 • Read texts associated with session number 23 (**) • Solving session 23 questions from the preparation brochure	1,66	
12	23	• Flow control [section 3.5.5, (pp. 288-290; pp. 246-249; pp. 276-278)] • TCP connection management [section 3.5.6, (pp. 290-297; pp. 249-255; pp. 278-284)]	X			No	• Study concepts acquired on session 23 • Read texts associated with session number 24 • Solving session 24 questions from the preparation brochure • Prepare Third Knowledge Test	1,66	7h
12	24	• Study Cases of TCP operation • **Third Knowledge Test: S19, S21 and S22**		X		No	• Study concepts acquired on session 24 • Read texts associated with session number 25 • Solving session 25 questions from the preparation brochure	1,66	
13	25	• Congestion control in TCP [section 3.7 until subsection TCP Congestion Control: Retrospective, (pp. 307-314; pp. 265-272; pp. 295-303)]	X			No	• Study concepts acquired on session 25 • Solving session 26 questions from the preparation brochure	1,66	7h
13	26	• Study Cases of TCP operation		X		No	• Study concepts acquired on session S01-S25	1,66	
14	27	• Review class for concepts related to IP, UDP and TCP	X			No	• Study concepts acquired during the course (S01-S26) • Auto-evaluation exercises	1,66	7h

14	28	• **Fourth Knowledge Test: S01-S27.**		X			• Study concepts acquired during the course (S01-S26)	1,66	
	16+29	Lab. Exercise: routers configuration and operation (2nd part)		X		Yes (2)	• Study the concepts acquired during session 16+29	1,66	
96							**Subtotal 1**	**48,14**	**96**
			Total 1 *(Class Hours and Homework hours between weeks 1 and 14)*					144,14	
15		Class reschedules, office hours, deliverables, etc							
16		Evaluation preparation and evaluation						3	10
17									
18									
							Subtotal 2	**3**	**10**
			Total 2 *((Class Hours and Homework hours between weeks 15 and 18)*					13	
TOTAL *(Total 1 + Total 2. <u>Max. 180 hours</u>)*								157,14	

(*) The description of personal work refers to the work that the student must do to prepare the next class of the same type (aggregated or basic group).
For Instance, the description for personal works associated to session 1 indicates the work that the student should do between the end of session 1 and the begging of session 3 (the next of the same group type). Similarly, the description for personal works associated to session 2 indicates the work that the student should do between the edn of session 2 and the beginning of session 4 (the next class of the same group type).

(**)Texts are from the book: J. F. Kurose, K. W. Ross; "Computer Networking, a top-down approach", 5th edition, Pearson – Addison Wesley, 2009. There is a version of this book in Spanish, although the students are encouraged to follow the English edition. It is available a 6th edition of the English version of the book (the students can use any of the English editions, since there are not significant changes in the chapters covering the concepts of this course). The pages from the 5th edition in English, 5th edition in Spanish and 6th edition in English are indicated by the following symbols (), (),(), respectively.