Universidad Carlos III de Madrid
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COURSE: Telematic Applications		
DEGREE: Bachelor's Degree in Telematics Engineering	**YEAR: 3º**	**TERM: 1º**

La asignatura tiene 29 sesiones que se distribuyen a lo largo de 14 semanas. Los laboratorios pueden situarse en cualquiera de ellas. Semanalmente el alumnos tendrá dos sesiones, excepto en un caso que serán tres

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	Introduction.	X			NO	Review of concepts studied in previous courses.	1,66	
1	2	Global project.		X		NO	Global project presentation.	1,66	7

2	3	TCP: Advanced aspects of transport protocols. Introduction to TCP. Establishing and finishing connections. State diagram. Massive and interactive traffic. TCP algorithms: Nagle	X			NO	Study references: * W. R. Stevens. "TCP/IP Illustrated Vol.1 The protocols". Addison-Wesley, 1994. (Chapters 17 to19). * Ying-Dar Lin, Ren-Hung Hwang, Fred Baker. Computer networks: an open source approach. McGraw-Hill, 2012. (Chapter 5). * RFC 793: Transmission Control Protocol.	1,66	7
2	4	Introduction to sockets programming		X		NO	Study references: * Ying-Dar Lin, Ren-Hung Hwang, Fred Baker. Computer networks: an open source approach. McGraw-Hill, 2012. (Chapter 5). * Beej's Guide to Network Programming (http://beej.us/guide/bgnet/)	1,66	
3	5	TCP: slow start, congestion control, fast recovery/fast retransmit, etc. - TCP timers: retransmission, persistence, keep-alive. Calculus and practical considerations. Karn/Partridge algorithm. Congestion avoidance. Fast retransmit/fast recovery. Persist timer. Silly window syndrome. Keepalive timer. TCP variants: TCP New Reno, Vegas, CUBIC, CTCP.	X			NO	Study references: * W. R. Stevens. "TCP/IP Illustrated Vol.1 The protocols". Addison-Wesley, 1994. (Chapters 20 to 24). * Ying-Dar Lin, Ren-Hung Hwang, Fred Baker. Computer networks: an open source approach. McGraw-Hill, 2012. (Chapter 5). * RFC 5681: TCP Slow Start, Congestion Avoidance, Fast Retransmit, and Fast Recovery Algorithms. * RFC 7323: TCP Extensions for High Performance * RFC 2018: TCP Selective Acknowledgment Options	1,66	7
3	6	TCP exercises		X		NO	Solve proposed exercises.	1,66	

4	7	Security in application and transport layer protocols. TLS/SSL.	X			NO	Study references: * Tanenbaum. A.S.: "Computer Networks", 5 Ed., Prentice Hall, 2011. (Chapter 8) * Kurose, James F.; Ross, Keith W., Computer Networking (6th ed.), Pearson Education, 2012. (Chapter 8)	1,66	7
4	8	Global project		X	Telematic Engineering dpto. lab	NO	Development of a guided practical about sockets programming.	1,66	
5	9	Domain Name System (DNS): Introduction. Name spaces. Domain and zone concept. Primary and secondary DNS servers. Root name servers. Types of DNS queries. Cache of resource records.	X			NO	Study references: * Ying-Dar Lin, Ren-Hung Hwang, Fred Baker. Computer networks: an open source approach. McGraw-Hill, 2012. (Chapter 6.2) * K. R. Fall and W. R. Stevens. TCP/IP Illustrated, Vol. 1 - The protocols, (2nd Ed.). Addison-Wesley 2011. (Chapter 11).	1,66	7
5	10	Global project		X	Telematic Engineering dpto. lab.	NO	Development of the global project.	1,66	
6	11	DNS: resource records format and types. Message format. Extensions.	X			NO	Study references: * RFC 1034: Domain names - concepts and facilities * RFC 1035: Domain names - implementation and specification	1,66	7
6	12	DNS exercises		X		NO	Solve proposed exercises.	1,66	
7	13	Remote terminal. Rlogin: protocol, authentication, flow control, commands, special characters. Telnet: NVT, commands, options negotiation, sub-options. Other related protocols: rsh, rexec, ssh.	X			NO	Study references: * W. R. Stevens. "TCP/IP Illustrated Vol.1 The protocols". Addison-Wesley, 1994. (Chapter 26)	1,66	

							* RFC 1282: BSD Rlogin * RFC 854: Telnet Protocol Specification * RFC 855: Telnet Option Specifications		7
7	14	Practical assignment on DNS.		X	Telematic Engineering dpto. lab.	NO	Development of the guided practical assignment on DNS.	1,66	
8	15	File transfer. FTP: commands, replies, data connection, transmission format, passive FTP. TFTP.	X			NO	Study references: * Ying-Dar Lin, Ren-Hung Hwang, Fred Baker. Computer networks: an open source approach. McGraw-Hill, 2012. (Chapter 6.5) * W. R. Stevens. "TCP/IP Illustrated Vol.1 The protocols". Addison-Wesley, 1994. (Chapters 15 to 27) * RFC 959: File Transfer Protocol * RFC 1350: The TFTP Protocol (Revision 2)	1,66	7
8	16	Remote login and file transfer exercises.		X		NO	Solve proposed exercises.	1,66	
9	17	E-mail: architecture, message format (RFC 822 and MIME)	X			NO	Study references: * Ying-Dar Lin, Ren-Hung Hwang, Fred Baker. Computer networks: an open source approach. McGraw-Hill, 2012. (Chapter 6.3) * RFC 822: Standard for The Format of Arpa Internet Text Messages * RFC 2045: Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies * RFC 2046: Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types	1,66	7

9	18	Exam of the practical assignment on DNS. Practical assignment on remote login and file transfer.		X	Telematic Engineering dpto. lab.	YES	Exam of the practical assignment on DNS. Development of the guided practical assignment on remote login and file transfer.	1,66	
10	19	E-mail: message transport protocols (SMTP, ESMTP). Final delivery (POP3)	X			NO	Study references: * RFC 821: Simple Mail Transfer Protocol * RFC 5321: Simple Mail Transfer Protocol * RFC 1939: Post Office Protocol - Version 3	1,66	7
10	20	Exam of the global project		X	Telematic Engineering dpto. lab.	YES	Exam of the global project.	1,66	
11	21	E-mail: final delivery (IMAPv4)	X			NO	Study references: * RFC 3501: Internet Message Access Protocol - Version 4rev1	1,66	
11	22	E-mail exercises.		X		NO	Solve proposed exercises.	1,66	7
12	23	Web: Introduction, resource location: URL format, HTTP protocol: HTTP/0.9, HTTP/1.0. Authentication. State management.	X			NO	Study references: * B. Forouzan. TCP/IP Protocol Suite, 3º Ed, McGraw-Hill, 2003 (Chapter 22). * RFC 1738: Uniform Resource Locators (URL) * RFC 1945: Hypertext Transfer Protocol -- HTTP/1.0 * RFC 2965: HTTP State Management Mechanism	1,66	7
12	24	Exam of the practical assignment on remote login and file transfer.		X	Telematic Engineering	YES	Exam of the practical assignment on remote login and file transfer.	1,66	

		Practical assignment on e-mail.			dpto. lab.		Development of the guided practical assignment on e-mail.		
13	25	Web: caches and proxies. HTTP/1.1: date header, host header, persistent connections, bandwidth optimization, chunked data. Caching. Content negotiation. Extensions. Content Distribution Networks. Peer to peer applications.	X			NO	Study references: * RFC 2616: Hypertext Transfer Protocol -- HTTP/1.1	1,66	7
13	26	Web exercices		X		NO	Solve proposed exercises.	1,66	
14	27	HTTP/2. HTTP/3. QUIC. CoAP.	X			NO	Study references: * RFC 7540: Hypertext Transfer Protocol Version 2 (HTTP/2) * RFC 7541: HPACK: Header Compression for HTTP/2 * Ilya Grigorik: "HTTP/2: A New Excerpt from High Performance Browser Networking", O'Reilly 2013 * draft-ietf-quic-http-latest. "Hypertext Transfer Protocol Version 3 (HTTP/3)" * RFC 7252: The Constrained Application Protocol (CoAP). * draft-ietf-quic-transport-20: "QUIC: A UDP-Based Multiplexed and Secure Transport"	1,66	7
14	28	Exam of the practical assignment on e-mail. Practical assignment on web.		X	Telematic Engineering dpto. lab.	YES	Exam of the practical assignment on e-mail. Development of the guided practical assignment on web.	1,66	
10	29	Exam of the global project		X	Telematic Engineering dpto. lab.	YES	Exam of the global project.	1,66	

							Subtotal 1	**48,33**	**98**
							Total 1 *(Hours of class plus student homework hours between weeks 1-14)*	146,33	
15		Exam of the practical assignment on web. Tutorials, handing in, etc					Exam of the practical assignment on web.	1,66	7
16		Assessment						3	
17									
18									21
							Subtotal 2	**4,66**	**28**
							Total 2 *(Hours of class plus student homework hours between weeks 15-18)*	25,66	

TOTAL *(Total 1 + Total 2. Maximum 180 hours)*	**179**