COURSE: Advanced communication networks and services		
DEGREE: Telematics Engineering	**YEAR: 3rd**	**TERM: 1st**

WEEKLY SCHEDULE OF THE COURSE

WEEK	SESSION	DESCRIPTION	GROUPS (mark with X)		SPECIAL ROOM FOR SESSION (Computer class room, audio-visual classroom)	Indicate YES/NO if the session requires 2 teachers	WEEKLY WORK FOR STUDENT		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS (Max. 7h per week)
1	1	• Presentation of the course • Introduction to the virtual environment and the equipment of the laboratories • Review of IP Network routing		X		No	• Review IP concepts • Install the virtual laboratory on the personal PC • Solve a simple IP addressing exercise	1,66	7h
1	2	• Introduction to the development of protocols with librawnet. Ethernet client/server example • Design of an ARP client	X		Online virtual lab.	No	• Review the Address Resolution Protocol • Download the provided code • Prepare the ARP client pseudocode	1,66	

2	3	• General structure of the ARP/IP/UDP protocol stack implementation • IP network layer design: layer structure, provided functions and IP header		X		No	• Review IP network level: IP addresses, IP header • Prepare prototype of IP layer functions • Prepare pseudocode function ipv4_route_lookup ()	1,66	7h
2	4	• Development of an ARP client • Test the ARP client functionality	X		Online virtual lab.	Yes	• Finish the implementation of the ARP client	1,66	
3	5	• IP network layer design: send/receive and client/server		X		No	• Continue with the development of IP network layer • Prepare pseudocode of ipv4_send() and ipv4_recv()	1,66	7h
3	6	• IP network layer development: General layer structure, IP header, *route lookup function*	X		Online virtual lab.	Yes	• Continue with the development of the IP network layer	1,66	
4	7	• UDP transport layer design: General layer structure, port handling		X		No	• Review UDP Transport: Ports, UDP Header and Pseudo-header IP • Prepare pseudocode and the prototypes of udp_open(), udp_close(), udp_send() and udp_recv()	1,66	7h
4	8	• IP network layer development: send/receive and client/server • Test the IP network-layer functionality	X		Online virtual lab.	Yes	• Finish the development of the IP network layer	1,66	
5	9	• IP configuration on routers and hosts: Linksys routers and the IP command		X	Online virtual lab.	No	• Finish the development of the ARP/IP/UDP stack • Prepare IP configuration exercise for routers and host • Prepare the configuration for the static routing scenario • Complete the design and test the configuration using the virtual lab.	1,66	7h
5	10	• Development of the UDP transport layer • Test the UDP transport layer functionality	X		Online virtual lab.	Yes	• Finish the development of the ARP/IP/UDP stack	1,66	

							• Deliver the ARP/IP/UDP (without improvements) developed		
6	11	• Evaluation of the developed ARP/IP/UDP Protocol stack (I) • Configuring a static routing environment (I)		X	Online virtual lab.	Yes	• Finish the configuration for the static routing scenario	1,66	7h
6	12	• RIP routing protocol	X		Online virtual lab.	No	• Review how RIPv2 works	1,66	
7	13	• Evaluation of the developed ARP/IP/UDP protocol stack (II) • Configuration of a static routing environment (II) • Test the static routing environment		X	Online virtual lab.	Yes	• Finish the configuration for the static routing scenario	1,66	7h
7	14	• Configuration and deployment of RIP protocol: basic configuration, advanced aspects and monitoring	X		Online virtual lab.	No	• Prepare the configuration for the RIPv2 scenario • Test the RIPv2 configuration using the virtual lab.	1,66	
8	15	• OSPF routing protocol • Configuration and deployment of the OSPF protocol: basic configuration, advanced aspects and monitoring • Advanced aspects of configuration and deployment of the RIP and OSPF protocols		X	Online virtual lab.	No	• Prepare the configuration for the OSPF scenario • Prepare questions about ARP/IP/UDP development to be solved during S17	1,66	7h
8	16	• Configuration of a RIP-based routing environment • Test the RIP-based routing environment	X		Online virtual lab.	Yes	• Finish the configuration for the RIPv2 routing scenario • Test the OSPF configuration using the virtual lab.	1,66	
9	17	• Problem resolution session regarding the development of ARP/IP/UDP protocol stack • Introduction/preparation to the development of the RIPv2 daemon		X	Online virtual lab.	No	• Finish the development of the ARP/IP/UDP stack	1,66	7h
9	18	• Configuration of an OSPF-based routing environment • Test the OSPF-based routing environment	X		Online virtual lab.	Yes	• Finish the routers lab	1,66	
10	19	• Design of a RIPv2 daemon: general design, RIPv2 message format and RIPv2 client	X			No	• Finish the routers lab • Prepare pseudocode of the RIPv2 client	1,66	7h

10	20	• Configuration of an OSPF-and RIP-based routing environment • Test the OSPF-and RIP-based routing environment	X		Online virtual lab.	Yes	• Finish the routers lab • Edit the deliverables on the full routing scenario	1,66	
11	21	• Evaluation of the complete routing environment (I) • Development of a RIPv2 daemon: RIPv2 messages And RIPV2 client		X	Online virtual lab.	Yes	• Continue the development of the RIPv2 daemon (client)	1,66	7h
11	22	• Design of a RIPv2 daemon: Handling RIPv2 routing tables and enabling multicast reception	X		Online virtual lab.	No	• Prepare code modifications of functions eth_recv() and ipv4_recv()	1,66	
12	23	• Evaluation of the complete routing environment (II) • Development of a RIPV2 daemon: handling RIPv2 routing tables and multicast reception		X	Online virtual lab.	Yes	• Continue the development of the RIPv2 daemon	1,66	7h
12	24	• Design of a RIPv2 daemon: RIPv2 Server	X		Online virtual lab.	No	• Prepare the RIPv2 state machine (daemon/server)	1,66	
13	25	• Design of a RIPv2 daemon: questions/improvements		X	Online virtual lab.	No	• Continue the development of the RIPv2 daemon	1,66	7h
13	26	• Development of a RIPv2 daemon: RIPv2 server	X		Online virtual lab.	Yes	• Continue the development of the RIPv2 daemon	1,66	
14	27	• Design of a RIPv2 daemon: questions/improvements		X	Online virtual lab.	No	• Continue the development of the RIPv2 daemon	1,66	7h
14	28	• Development of a RIPv2 daemon • Test the developed RIPv2 daemon	X		Online virtual lab.	Yes	• Group tutorials with routers (2X2h) • Prepare the delivery of the RIPv2 daemon and improved protocol stack	1,66	
15	29	• Evaluation of the RIPv2 daemon and the protocol stack with the improvements (I)		X	Online virtual lab.	Yes		1,66	
							Subtotal 1	**48,33**	**98**
		Total 1 *(Hours of class plus student homework hours between weeks 1-14)*						146,33	
15	30	• Evaluation of the RIPv2 daemon and the protocol stack with the improvements (II)		X	Online virtual lab.	Yes		1,66	
16-18		• Final Exam (non-continuous evaluation only)				No		1,66	7
							Subtotal 2	**3,33**	**7**

Total 2 *(Hours of class plus student homework hours between weeks 15-18)*	10,33
TOTAL *(Total 1 + Total 2. Maximum 180 hours)*	**156,66**