





Teacher(s)	Lugan Sébastien ;Macq Benoît ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Main themes	<ul style="list-style-type: none"> <li>• Introduction, media access control, layered models,</li> <li>• Internet Protocol, IP routing, introduction to IPv6,</li> <li>• DNS, e-mail, common protocols,</li> <li>• Multimedia networking (streaming, VoIP, DVB),</li> <li>• Network security and advanced topics.</li> </ul>
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>With respect to the AA referring system defined for the Master in Electrical Engineering, the course contributes to the development mastery and assessment of the following skills :</p> <ul style="list-style-type: none"> <li>• AA1.1, AA1.2, AA1.3</li> <li>• AA2.1, AA2.3, AA2.4</li> <li>• AA5.1, AA5.2, AA5.3, AA5.5.</li> </ul> <p>At the end of this course, the students will be able to</p> <ol style="list-style-type: none"> <li>1                     <ul style="list-style-type: none"> <li>• understand the architecture of communication networks,</li> <li>• identify the routing strategies which are best suited to a particular network topology,</li> <li>• understand resource management strategies allowing to guarantee a quality of service, particularly for multimedia communications,</li> <li>• design architectures allowing secure communications.</li> </ul> </li> </ol> <p>Transverse learning outcomes :</p> <ul style="list-style-type: none"> <li>• use a network simulation tool (Netkit),</li> <li>• configure network parameters of a Linux based system using low-level commands,</li> <li>• configure a router using a (Cisco) IOS-like syntax</li> </ul>
Evaluation methods	Written exam
Teaching methods	- Traditional lectures, - Labs in computer room allowing the student to use the theoretical concepts seen during the lecture on a simulated network
Content	<p>Part 1 (networking):</p> <ul style="list-style-type: none"> <li>• Introduction to communication networks,</li> <li>• Media Access Control, Layered models,</li> <li>• Internet Protocol, IP fragmentation,</li> <li>• UDP, TCP, ICMP, traceroute &amp; PMTU discovery,</li> <li>• Static IP routing, dynamic routing (algorithms and protocols),</li> <li>• DNS, e-mail (SMTP, POP3, IMAP4),</li> <li>• common protocols (HTTP, FTP, etc.),</li> <li>• NAT, introduction to IPv6,</li> <li>• wireless network protocols (3G/4G/5G, Wifi, BlueTooth, BLE),</li> <li>• wearable devices, IoT &amp; smart sensors (Zigbee, NFC, Lora, Sigfox).</li> </ul> <p>Part 2 (multimedia/security):</p> <ul style="list-style-type: none"> <li>• Introduction to multimedia networking,</li> <li>• Multimedia streaming (stored multimedia, live, real-time interactive),</li> <li>• Introduction to audio and video compression,</li> <li>• Streaming protocols,</li> <li>• VoIP (ToIP, video conferencing, SIP),</li> <li>• Digital Video Broadcasting (DVB),</li> <li>• Introduction to network security, principles of cryptography,</li> <li>• Message integrity, digital signature, certification authorities, PKI,</li> </ul>

	<ul style="list-style-type: none"> <li>• Secure e-mail and network connections (X.509, SSL).</li> </ul>
Inline resources	Moodle : <a href="http://moodleucl.uclouvain.be/course/view.php?id=5733">http://moodleucl.uclouvain.be/course/view.php?id=5733</a>
Bibliography	<ul style="list-style-type: none"> <li>- Notes de cours,</li> <li>- James Kurose and Keith Ross, «Computer Networking, A Top-Down Approach Featuring the Internet».</li> </ul>
Other infos	Labs in computer room
Faculty or entity in charge	ELEC

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Environmental Bioengineering	<a href="#">BIRE2M</a>	5		
Master [120] in Electrical Engineering	<a href="#">ELEC2M</a>	5		
Master [120] in Chemistry and Bioindustries	<a href="#">BIRC2M</a>	5		
Master [120] in Electro-mechanical Engineering	<a href="#">ELME2M</a>	5		
Master [120] in Agricultural Bioengineering	<a href="#">BIRA2M</a>	5		