



Programme of Module "Advanced Computer Networks: Internetworking"

- Code: DT0042
- Type of course unit: Elective (Master Degree in Computer Science curriculum General)
- Level of course unit: Postgraduate Degrees
- Semester: 2

Number of ects credits: (Master Degree in Computer Science) 6 (workload 150 hours)

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1	<b>Course objectives</b>	This module invites students to explore the networking, routing, transport and application protocols that are used in the Internet. The module encourages students to understand the key architectural issues in the design, development and implementation of Internet protocols using lectures, seminars and tutorials. Protocol specifications and standards such as IPv6 as necessary evolution of IPv4, IntServ and DiffServ to manage the quality of service (QoS), IPsec to ensure security, etc. will be examined and the use of techniques such as MPLS to improve the performance of forwarding, and protocols such as Mobile IP to manage mobility, and RTP/RTSP for Video transmission will also be investigated. Finally, in the light of the knowledge gained on internetworking protocols, we present some IP-based applications, such as VoIP and 6LoWPAN.
2	<b>Course content and learning outcomes (dublin descriptors)</b>	<p>Topics of the module include:</p> <ul style="list-style-type: none"> <li>• The routing IP in Internet</li> <li>• IP version 6</li> <li>• IP and mobility: Mobile IP</li> <li>• The DNS (Domain Name System)</li> <li>• The DHCP (Dynamic Host Configuration Protocol)</li> <li>• Quality of Service in InternetIP switching and Multi-Protocol Label Switching (MPLS)</li> <li>• Security in Internet</li> <li>• IP network management and Simple Network Management Protocol (SNMP)</li> <li>• Some IP-based applications: - Voice over IP (VoIP) - Internet Protocol Television (IPTV) - Sensor Networks (IPv6 -6lowPAN)</li> </ul> <p>On successful completion of this module, the student should :</p> <ol style="list-style-type: none"> <li>1. Demonstrate the knowledge of the essential features and operation of Internet Protocols; 2) Understand the principle and operation of a set of protocols in the TCP/IP suite</li> </ol> <p>Protocols</p> <ol style="list-style-type: none"> <li>1. Analyze a range of network protocols; 2) Design a protocol with a finite state structure to meet pre-specified requirements</li> </ol> <ol style="list-style-type: none"> <li>1. Analyze and evaluate performance of complex networks; 2) Implement or analyze new networking applications</li> </ol> <ul style="list-style-type: none"> <li>• Explain the use of network monitoring and performance tools</li> </ul>
3	<b>Course prerequisites</b>	It is strongly recommended to have passed the exam of Computer Networks in order to have a knowledge of the problems of networking and internetworking.
4	<b>Teaching methods and language</b>	<p>The course consists of a main part and a series of seminars on the following topics: - IP Routing in the Internet - Security on the Internet</p> <p><b>Language:</b> English</p> <p><b>Reference textbooks</b></p> <ul style="list-style-type: none"> <li>• M. Baldi, P. Nicoletti, <i>Internetworking</i>. McGraw-Hill Milano. 1999.</li> <li>• Fred Halsall, <i>Networking e Internet, 5ed.</i>. Pearson Education – Addison Wesley. 2006.</li> <li>• W. Stallings, <i>Sicurezza delle reti – Applicazioni e standard, 3ed.</i>. Pearson – Prentice Hall. 2007.</li> </ul>
5	<b>Assessment</b>	The exam consists of a single written test, with numerical exercises and open-ended

**methods**

questions.