

# **International class**

Final year of the Professional Bachelor 's Degree  
in Computer Networks and Telecommunications  
*specialising in Computer networks, mobility, security*

Licence Professionnelle (Troisième année)  
**Métiers des Réseaux et Télécommunications**  
*Parcours : Réseaux informatique, mobilité, sécurité*

More information:

<http://iut1.univ-grenoble-alpes.fr/wins>  
[Denis.lubineau@univ-grenoble-alpes.fr](mailto:Denis.lubineau@univ-grenoble-alpes.fr)  
[jean-marc.thiriet@univ-grenoble-alpes.fr](mailto:jean-marc.thiriet@univ-grenoble-alpes.fr)

IUT1 Grenoble  
151 rue de la Papeterie  
Domaine Universitaire  
38402 Saint Martin d'Hères

| <b>COURSES</b>   | <b>Number of hours<br/>420 + projects</b> | <b>ECTS</b>                         |
|--|---|-------------------------------------|
| <b>1<sup>st</sup> SEMESTER</b>   | <b>360</b>                                | <b>30</b>                           |
| <b>General courses</b>   |   | <b>6</b>                            |
| M11: Communication skills  | 25  | 2                                   |
| M13: Language skills<br>(English / Français Langue Étrangère...)   | 30  | 2                                   |
| M14: Project management  | 30  | 2                                   |
| <b>Fundamental scientific and technological courses</b>  |   | <b>9</b>                            |
| M21: Computer Networks   | 30  | 2                                   |
| M23: System administration   | 30  | 2                                   |
| M24: Digital communications and trans. medium  | 40  | 3                                   |
| M25: Network Security  | 30  | 2                                   |
| <b>Specialised Scientific and technological courses</b>  |   | <b>10</b>                           |
| M31: VOIP – real time flows  | 15  | 1                                   |
| M32: Mobile Transmission systems   | 40  | 3                                   |
| M33: Security of networking infrastructures  | 30  | 2                                   |
| M34: Advanced Computing Networks   | 30  | 2                                   |
| M35: Wireless Networks   | 30  | 2                                   |
| <b>4PT1: Academic project</b>  |   | <b>5</b>                            |
| <b>2<sup>nd</sup> SEMESTER</b>   | <b>60</b>                                 | <b>30</b>                           |
| M12: Introduction to Internet Legislation  | 20  | 2                                   |
| M22: Database management systems   | 40  | 2                                   |
| 4PT2: Academic project audit   |   | 1                                   |
| 4ST: Industrial placement in a company or research laboratory  |   | 25                                  |
| <ul style="list-style-type: none"> <li>• <b>1<sup>st</sup> semester:</b> 360 hours tuition in the (26 ECTS)<br/>+ academic project or thesis (5 ECTS),</li> <li>• <b>2<sup>nd</sup> semester (option2 only) :</b><br/>60 hours tuition in the 2nd semester (4 ECTS)<br/>+ 2nd part of Academic project (1 ECTS)<br/>+work placement in a company/ research laboratory (25 ECTS)</li> </ul> |   | <b>30 ECTS<br/>per<br/>semester</b> |

| Reference                           | <b>M11</b>  | Hours                       | <b>25</b> | ECTS | <b>2</b> |
|-------------------------------------|---|-----------------------------|-----------|------|----------|
| <b>Name of the module (English)</b> |   | <b>Communication skills</b> |           |      |          |
| Name of the module (French)         |   | Communication               |           |      |          |
| Pre-requisites                      | No pre-requisites   |                             |           |      |          |
| Content of the module (English)     | <p><b>Programme</b><br/>This course aims at learning how to use communications tools, for oral presentation, written report, and also some considerations on how to prepare an application for a job in an international context.<br/>It also aims to use communication skills to debate about cultural and technological issues, in oral presentation, or to resolve conflicts in different situation (using theatrical skills).</p> |                             |           |      |          |
| Keywords                            |   |                             |           |      |          |

| Reference                           | <b>M13</b>  | Hours                               | <b>30</b> | ECTS | <b>2</b> |
|-------------------------------------|---|-------------------------------------|-----------|------|----------|
| <b>Name of the module (English)</b> |   | <b>French as a foreign language</b> |           |      |          |
| Name of the module (French)         |   | Français Langue Etrangère           |           |      |          |
| Pre-requisites                      | No pre-requisites   |                                     |           |      |          |
| Content of the module (English)     | <p><b>Objectives</b><br/>This is a basic course in French language (Français Langue Etrangère/French as a foreign language).<br/>The objective of this module is:<br/>- to enable students to function in French in everyday situations<br/>- to encourage students to further their knowledge of France and its culture</p> <p><b>Programme</b><br/>The course will be adapted to the students' standard in spoken French.<br/>1° Survival French - Basic communication skills in everyday French including introductions/ description techniques etc.<br/>2° Talks (in English) on the French/European economic environment.</p> <p><b>Competences</b><br/>basic communication skills</p> |                                     |           |      |          |
| Keywords                            |   |                                     |           |      |          |

|                                     |   |                                  |           |             |          |
|-------------------------------------|---|----------------------------------|-----------|-------------|----------|
| <b>Reference</b>                    | <b>M13</b>  | <b>Hours</b>                     | <b>30</b> | <b>ECTS</b> | <b>2</b> |
| <b>Name of the module (English)</b> |   | <b>Language skills : english</b> |           |             |          |
| Name of the module (French)         |   | Anglais                          |           |             |          |
| Pre-requisites                      | No pre-requisites   |                                  |           |             |          |
| Content of the module (English)     | <p><b>Programme</b><br/>This course aims at learning how to use communications tools, for oral presentation, written report, and also some considerations on how to prepare an application for a job in an international context.</p> |                                  |           |             |          |
| Keywords                            |   |                                  |           |             |          |

|                                     |   |                           |           |             |          |
|-------------------------------------|---|---------------------------|-----------|-------------|----------|
| <b>Reference</b>                    | <b>M14</b>  | <b>Hours</b>              | <b>30</b> | <b>ECTS</b> | <b>2</b> |
| <b>Name of the module (English)</b> |   | <b>Project management</b> |           |             |          |
| Name of the module (French)         |   | Gestion de projet         |           |             |          |
| Pre-requisites                      | No pre-requisites   |                           |           |             |          |
| Content of the module (English)     | <p><b>Objectives</b><br/>The purpose is to initiate students with the project management.</p> <p><b>Programme</b><br/>This course is also practically implemented in the academic project which should be resolved by students.</p> |                           |           |             |          |
| Keywords                            |   |                           |           |             |          |

| Reference                           | M21  | Hours                    | 30 | ECTS | 2 |
|-------------------------------------|--|--------------------------|----|------|---|
| <b>Name of the module (English)</b> |  | <b>Computer networks</b> |    |      |   |
| Name of the module (French)         |  | Réseaux informatiques    |    |      |   |
| Pre-requisites                      | Binary encoding<br>Basic computing knowledges about computers  |                          |    |      |   |
| Content of the module (English)     | <p><b>Objectives</b><br/>Knowing the bases of computer networks technologies</p> <p><b>Programme</b><br/>This course deals with computer networks.<br/>Topology: bus, ring, star, meshed networks<br/>Circuit and packet switching: Connection and connectionless networks<br/>Elements of theory: Bandwidth and throughput<br/>Encapsulation: OSI model<br/>Layer 1: supports<br/>Layer 2: Ethernet and IEEE standards, MAC layer – Medium access - LLC<br/>TCP/IP: Addressing – routing – elements of dynamic routing - associated services: ICMP<br/>ARP<br/>Services: DNS, Web, mail</p> <p><b>Competences / labs:</b><br/>The underlying Operating System is mainly Linux.<br/>TCP/IP configuration – Elements of OS management (accounts – rights...)<br/>Domain Name Service (Bind)<br/>Web services (Apache)</p> |                          |    |      |   |
| Keywords                            | TCP/IP, LAN, Network administration  |                          |    |      |   |

| Reference                           | M23  | Hours                        | 30 | ECTS | 2 |
|-------------------------------------|--|------------------------------|----|------|---|
| <b>Name of the module (English)</b> |  | <b>System administration</b> |    |      |   |
| Name of the module (French)         |  | Administration des systèmes  |    |      |   |
| Pre-requisites                      | No pre-requisites  |                              |    |      |   |
| Content of the module (English)     | <p><b>Objectives</b><br/>Being able to administrate a local network managed by Windows Active Directory in virtual environments</p> <p><b>Competences / labs</b><br/>Installing and managing a virtual system on a station (Virtual Box)<br/>Windows systems administration<br/>Active directory and group policies<br/>WDS (Windows Deployment System) and MDT (Microsoft Deployment Kit)<br/>Supervision with SNMP<br/>Administration with PowerShell (application to VMWare server supervision)</p> |                              |    |      |   |
| Keywords                            | Active Directory, GPO, MDT, WDS, SNMP, PowerShell  |                              |    |      |   |

| Reference                           | M24  | Hours   | 40 | ECTS | 3 |
|-------------------------------------|--|---|----|------|---|
| <b>Name of the module (English)</b> |  | <b>Digital communications and trans. medium</b> |    |      |   |
| Name of the module (French)         |  | Communications numériques et support            |    |      |   |
| Pre-requisites                      | mathematical functions (log, exp,...), trigonometric functions, complex numbers  |   |    |      |   |
| Content of the module (English)     | <p><b>Objectives</b><br/>           To differentiate the different telecommunication systems<br/>           To understand the different analog and digital modulations used<br/>           To understand the transmission protocols<br/>           To choose and implement a transmission medium<br/>           To characterize and measure signals in time and frequency domains<br/>           To use measurement equipment associated to different telecommunication systems</p> <p><b>Programme</b><br/>           - Introduction and history of the telecommunications<br/>           - Signal concept<br/>           - Time to frequency relation<br/>           - Signal transmission and effect of the channel transmission<br/>           - Copper cable (Impedance, attenuation, reflection, bandwidth, Reflectometry ...)<br/>           - Fiber optic (Principles, attenuation, bandwidth, splice, connection, Reflectometry...)<br/>           - Analog amplitude modulation and demodulation<br/>           - Digital modulations<br/>           - Signal multiplexing and introduction to protocols (SDH, OWM, FTTx ...)</p> <p><b>Competences / labs</b><br/>           - Analog Amplitude modulation and demodulation<br/>           - ASK, FSK, PSK and QAM digital modulations<br/>           - Optical and electrical reflectometry, electrical and optical cable analysis<br/>           - base band coding</p> |   |    |      |   |
| Keywords                            | Telecommunication systems, digital, analog communications  |   |    |      |   |

| Reference                           | M25  | Hours                   | 30 | ECTS | 2 |
|-------------------------------------|--|-------------------------|----|------|---|
| <b>Name of the module (English)</b> |  | <b>Network security</b> |    |      |   |
| Name of the module (French)         |  | Sécurité des réseaux    |    |      |   |
| Pre-requisites                      | Mainly networking (intermediate or advanced level), industrial computing   |                         |    |      |   |
| Content of the module (English)     | <p><b>Objectives</b><br/>           Be able to deploy, configure and maintain security software and devices in a network architecture in its environment, contributing to a global security policy.</p> <p><b>Programme</b><br/>           1. Error detection<br/>           2. Technologies for security<br/>           3. Security thanks to ciphering<br/>           4. Security Protocols<br/>           Labs<br/>           • Firewall: installation and test of a firewall (filtering and address translations)<br/>           • Cryptography with OpenSSL</p> |                         |    |      |   |
| Keywords                            | Security, Firewalls, cryptography, codes   |                         |    |      |   |

| Reference                           | M31   | Hours                         | 15 | ECTS | 1 |
|-------------------------------------|---|-------------------------------|----|------|---|
| <b>Name of the module (English)</b> |   | <b>VOIP – real time flows</b> |    |      |   |
| Name of the module (French)         |   | VOIP et flux temps réels      |    |      |   |
| Pre-requisites                      | No pre-requisites   |                               |    |      |   |
| Content of the module (English)     | <p><b>Objectives</b><br/>           Understanding the VOIP and real time transmissions concepts. Set-up a professional IP telephony system and an IPTV infrastructure.</p> <ul style="list-style-type: none"> <li>- understand the real-time flows constraints</li> <li>- understand the main protocols</li> <li>- know basic QOS concepts (quality de service)</li> <li>- know multicast flow management and routing (IPTV flows)</li> <li>- set-up a professional IPTV setup.</li> </ul> <p><b>Programme</b></p> <ul style="list-style-type: none"> <li>- Corporate telephony concepts</li> <li>- IP adaptation to IPTV</li> <li>- QOS concepts</li> <li>- Multicast streams</li> </ul> |                               |    |      |   |
| Keywords                            | IPTV, Multicast, QOS, VOIP  |                               |    |      |   |

| Reference                           | M32   | Hours                              | 40 | ECTS | 3 |
|-------------------------------------|---|------------------------------------|----|------|---|
| <b>Name of the module (English)</b> |   | <b>Mobile Transmission systems</b> |    |      |   |
| Name of the module (French)         |   | Systèmes de transmissions mobiles  |    |      |   |
| Pre-requisites                      | No pre-requisites   |                                    |    |      |   |
| Content of the module (English)     | <p><b>Objectives</b><br/>           Understand and set-up cellular phone networks (GSM/GPRS/EDGE, UMTS, LTE), Understand the network structure and the protocol stack.<br/>           To be able to operate on the maintenance, installation and management of these networks</p> <p><b>Programme</b></p> <ul style="list-style-type: none"> <li>Radio transmission concepts (antennas)</li> <li>Cellular communication introduction</li> <li>GSM protocol and physical layer</li> <li>GSM procedures</li> <li>Mobile Internet - GPRS/EDGE</li> <li>CDMA spread spectrum - OFDM</li> <li>3G – UMTS and 4G – LTE introduction</li> </ul> |                                    |    |      |   |
| Keywords                            | GSM, GPRS, EDGE, UMTS, CDMA, OFDM, LTE  |                                    |    |      |   |

| Reference                           | M33   | Hours   | 30 | ECTS | 2 |
|-------------------------------------|---|---|----|------|---|
| <b>Name of the module (English)</b> |   | <b>Security of networking infrastructures</b> |    |      |   |
| Name of the module (French)         |   | Sécurité des infrastructures                  |    |      |   |
| Pre-requisites                      | Mainly networking (intermediate or advanced level), industrial computing, + Course M25  |   |    |      |   |
| Content of the module (English)     | <p><b>Objectives</b><br/>Being able to design, maintain and audit a secure network architecture in its environment, contributing in the setting of a security policy</p> <p><b>Programme</b><br/>           1. Introduction to dependability, principles of security (physical, exploitation, logical, application, telecommunications...)<br/>           2. Strategies of attacks and organisms for security<br/>           3. Strategies and policies for security<br/>           4. Virus<br/>           5. Intrusion detection systems<br/>           Labs<br/>           • Metasploit tools for attack<br/>           • Audit, intrusion detection</p> |   |    |      |   |
| Keywords                            | Security, Risk analysis   |   |    |      |   |

| Reference                           | M34  | Hours                              | 30 | ECTS | 2 |
|-------------------------------------|--|------------------------------------|----|------|---|
| <b>Name of the module (English)</b> |  | <b>Advanced Computing Networks</b> |    |      |   |
| Name of the module (French)         |  | Réseaux informatiques avancés      |    |      |   |
| Pre-requisites                      | No pre-requisites  |                                    |    |      |   |
| Content of the module (English)     | <p><b>Objectives</b><br/>Knowing how to configure some advances technologies in Computer networks</p> <p><b>Programme</b><br/>           Dynamic routing: RIP / OSPF /BGP<br/>           IPv6 Networks<br/>           Filtering : Access-lists<br/>           Cisco Networking Academy (CCNA 1-4)</p> <p><b>Competences / Labs</b><br/>           IPv6 networks<br/>           Dynamic routing and filtering</p> |                                    |    |      |   |
| Keywords                            | Dynamic routing, ACL, RIP, OSPF, IPv6, Multicast   |                                    |    |      |   |



| Reference                           | M35   | Hours                    | 30 | ECTS | 2 |
|-------------------------------------|---|--------------------------|----|------|---|
| <b>Name of the module (English)</b> |   | <b>Wireless Networks</b> |    |      |   |
| Name of the module (French)         |   | Réseaux sans fil         |    |      |   |
| Pre-requisites                      | No pre-requisites   |                          |    |      |   |
| Content of the module (English)     | <p><b>Objectives</b><br/>Being able to design and deploy a Wireless System and to design the proper security infrastructure</p> <p><b>Programme</b><br/>Physical Layer: Modulations<br/>Mac Layer: CSMA/CA<br/>Site Survey and deployment<br/>Security: Wep – 802.11i – WPA/WAP2<br/>Elements on Mobile IP<br/>QoS</p> <p><b>Competences / labs</b><br/>Hotspot (Access Point + Radius + DBMS)<br/>802.11i – WPA enterprise + Radius + EAP<br/>Wireless controllers</p> |                          |    |      |   |
| Keywords                            | WiFi, EAP, 802.1x, Hotspot, WiFi controllers, access-points, 802.11   |                          |    |      |   |

| Reference                           | M12   | Hours                                       | 20 | ECTS | 2 |
|-------------------------------------|---|---|----|------|---|
| <b>Name of the module (English)</b> |   | <b>Introduction to Internet Legislation</b> |    |      |   |
| Name of the module (French)         |   | Introduction à la législation des réseaux   |    |      |   |
| Pre-requisites                      | No pre-requisites   |   |    |      |   |
| Content of the module (English)     | <p><b>Objectives</b><br/>Take into account law when designing and maintaining an information system</p> <p><b>Programme</b><br/>civil and criminal liability:<br/> <ul style="list-style-type: none"> <li>- Communication freedom</li> <li>- Confidentiality</li> <li>- Property</li> <li>- Copyrights</li> <li>- Freeware, counterfeit, hacking</li> </ul> Data security<br/> <ul style="list-style-type: none"> <li>- criminal liability</li> </ul> Electronic business<br/><br/> Digital signature<br/><br/> Contracts</p> |   |    |      |   |
| Keywords                            |   |   |    |      |   |

|                                     |   |  |           |             |          |
|-------------------------------------|---|--|-----------|-------------|----------|
| <b>Reference</b>                    | <b>M22</b>  | <b>Hours</b>                           | <b>40</b> | <b>ECTS</b> | <b>2</b> |
| <b>Name of the module (English)</b> |   | <b>Database management systems</b>     |           |             |          |
| Name of the module (French)         |   | Systèmes de Gestion de Base de données |           |             |          |
| Pre-requisites                      | Basic knowledge in development and/or databases   |  |           |             |          |
| Content of the module (English)     | <p><b>Objectives</b><br/>Databases modelling<br/>DBMS administration and use</p> <p>Being able to</p> <ul style="list-style-type: none"> <li>- Build a model in a DBMS</li> <li>- Create a data BASE on a DBMS</li> <li>- Query and manage the DBMS</li> <li>- Create a simple WEB system to interact with the database.</li> </ul> <p><b>Programme</b></p> <ul style="list-style-type: none"> <li>- Modelling and building a database (EA diagrams, integrity constraints)</li> <li>- SQL querying</li> <li>- Installing and managing the database</li> <li>- User access management</li> <li>- Web development bases (HTML)</li> <li>- Database access with PHP</li> <li>- Data security</li> </ul> |  |           |             |          |
| Keywords                            | DBMS, SQL, PHP, DataBases   |  |           |             |          |

|                                     |   |                         |           |             |          |
|-------------------------------------|---|-------------------------|-----------|-------------|----------|
| <b>Reference</b>                    | <b>4PT1</b>   | <b>Hours</b>            | <b>20</b> | <b>ECTS</b> | <b>2</b> |
| <b>Name of the module (English)</b> |   | <b>Academic project</b> |           |             |          |
| Name of the module (French)         |   | Projet tutoré           |           |             |          |
| Pre-requisites                      | Computer Networking and Project management skills   |                         |           |             |          |
| Content of the module (English)     | <p><b>Objectives</b><br/>Being able to design a middle-size network according to requirements.</p> <p><b>Programme</b><br/>The students will have to design a network with security aspects and a wireless extension, to implement it, and be audited by another group of students.<br/>This work is achieved as teams of 6 to 8 students, the students will have to organise themselves and take opportunity of the course on "project management".<br/>Some meetings with the teachers will be organised to validate the advancements of works.</p> |                         |           |             |          |
| Keywords                            |   |                         |           |             |          |

|                                     |   |                               |  |             |          |
|-------------------------------------|---|-------------------------------|--|-------------|----------|
| <b>Reference</b>                    | <b>4PT2</b>   | <b>Hours</b>                  |  | <b>ECTS</b> | <b>1</b> |
| <b>Name of the module (English)</b> |   | <b>Academic project audit</b> |  |             |          |
| Name of the module (French)         |   | Projet tutoré : audit         |  |             |          |
| Pre-requisites                      | Networking, operating systems, wireless networks, security audit  |                               |  |             |          |
| Content of the module (English)     | <p><b>Objectives</b><br/>Being able to identify the main characteristics of a network and to analyse the main security parameters.</p> <p><b>Programme</b><br/>This module concerns the security audit of a network designed by another group of students during academic projects, using vulnerabilities tools and analysing the provided documentation.</p> |                               |  |             |          |
| Keywords                            |   |                               |  |             |          |

| Reference                           | 5ST  | Hours   | ECTS | 1 |
|-------------------------------------|--|---|------|---|
| <b>Name of the module (English)</b> |  | <b>Industrial placement in a company or research laboratory</b> |      |   |
| Name of the module (French)         |  | Stage   |      |   |
| Pre-requisites                      | No pre-requisites  |   |      |   |
| Content of the module (English)     | <p><b>Objectives</b></p> <p>The purpose is to get a professional experience, and an opportunity to apply the knowledge and know-how (competences) acquired during the courses, on a practical situation.</p> <p>In company, the training period could ideally be connected as a part of a project, or several projects. It can also be a participation in the everyday life of the company, if the student can get new competences from this experiment.</p> <p><b>Programme</b></p> <p>A teacher is responsible for the contact with the company (one visit during the training period, or one phone call if the student is very far from Grenoble).</p> <p>Some opportunities are proposed all around Europe, and sometimes outside Europe, for students in the international programme.</p> |   |      |   |
| Keywords                            |  |   |      |   |