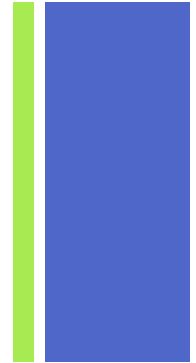


Industrial Telecoms

José María Foces Morán

Víctor González Castro

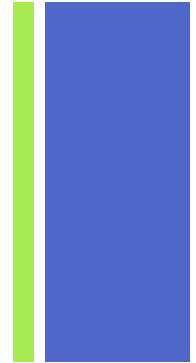
+ Lecturers and Lab Instructors



- José María Foces Morán
 - chema.foces@unileon.es
- Víctor González Castro
 - victor.gonzalez@unileon.com
- Web site (Documents, practicals, source code, etc.):

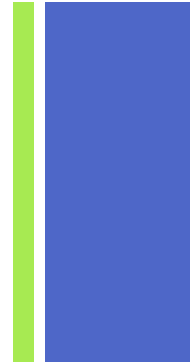
<http://paloalto.unileon.es/it>
- Technology II building
 - Office #363, Internal Phone # 5390
 - Lab B6, entry level: Technology-specific lab (B6) (Internal Phone # 5336)
- Lectures (A) and problem resolution (B1) sessions:
 - EIII Building, classroom no. 201-A
 - **Office hours** will be announced on the course's Google calendar

+ Goals



- Understand what Network Architecture is
 - “The Network is the Computer”
- Understand the Industrial Ethernet
- Program with sockets in C
- Build a basic hierarchical LAN and connect it to the Internet

+ Course contents



CHAPTERS

- 1. Introduction to Networking (Foces)
- 2. Signals, systems and fundamental laws (Foces)
- 3. Datalink layer and Industrial Ethernet (Foces)
- 4. LAN Switching and Spanning Tree (González)
- 5. IP Switching and IP numbering (González)
- 6. Transport Protocols (González)

+ Types of academic activities

Lectures (**A**)

- Perspective
- Orientation and motivation
- Course backbone, coordination, goal setting

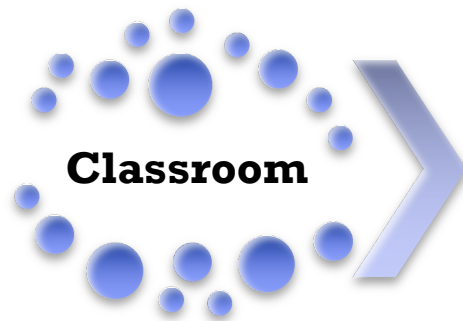
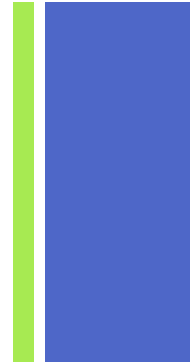
Problem resolution sessions (**B1**)

- Word exercises, examples, summaries, questions

Network-equipment labs (**B3**)

- Practice network programming and operation

+ Our responsibilities



Classroom

- **Participate!**
- Take notes
- Cell phone, portable, tablets



Lab and class attendance

All must comply with the Lab regulations, which are devised to provide a safe and correct work environment



Academic honesty

- Avoid **plagiarism**



Aptitude
vs.
attitude?

Both important for all of us

+ Grading (Exams announced on Google Calendar)

Grading

- Two term exams (TE1 and TE2) 60%
 - Passing each exam is a requisite for passing the course
 - *TE1 = Telecommunications (Foces) (1/4)*
 - *TE2 = Networking (Castro) (3/4)*
 - Participation
- Lab attendance (Compulsory!) + LabBook 25%
- Participation 10%
- Independent Project 5%

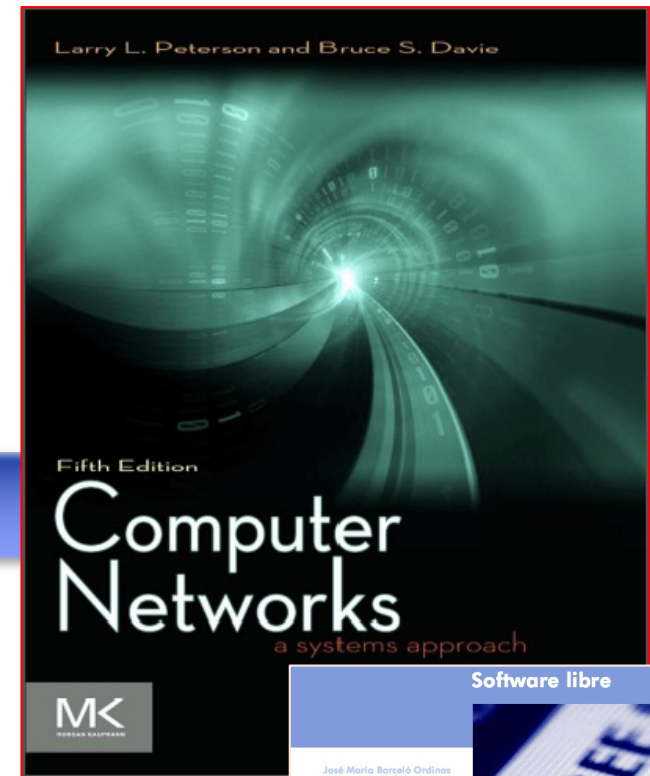
Exam Dates

- TE 1
 - 21th — March — 2023
 - Theory (Classroom 201-A) 9:00 -10:00 am
- TE 2
 - 30th — May — 2023
 - Theory (Classroom 201-A) 10:00 am
 - Practices (Lab B6) 12:00 am

+ Textbooks

Peterson and Davie Computer Networks, MKP, 5 ed.

- Available at the School Library and in lab B6
- Cornerstone of the course
- Essential: theory and exercises
- Resources at MKP



Redes de Computadores (UOC)

- <http://paloalto.unileon.es/tel/LibroRedesUOC.pdf>

Course web site:

- Practicals, notes and other resources by José M. Foces
<http://paloalto.unileon.es/it>



+ Practices

Technology II bldg., LAB B6

- ***The documents for the practices can be downloaded from paloalto.unileon.es/it***

Lab time must be supplemented by your independent study

- ***Regular attendance is essential***

Lab Book containing the most relevant results

Each student must build the following personal infrastructure

- ***Linux (Ubuntu recommended)***
- ***C for programming networks***
- ***Wireshark***
- ***Other network utilities***

Practical Exercises in Computer Networks

Experiments with the IP forwarding algorithm(WIP)

© 2013, José María Foces Morán

IP routers operate at the layer 3, the Network layer which functions consist of conveying IP packets in the internetwork. In former exercises we covered layer 2 communications in TCP/IP networks, now we transition to the internetwork and reproduce similar experiments to illustrate the forwarding function of IP routers. Other included exercises are oriented towards our understanding of other infrastructure and control-plane protocols such as ARP, DHCP and ICMP.

Understanding IP forwarding

In the lectures, after introducing the IP service model, the IP packet format and its main constituent concepts, we need to discover the networking equipment that implements those IP functionalities, to that end we now want to devise a testbed internetwork for experimenting with IP, its forwarding algorithm and addressing.

Basic requirements for the testbed internetwork. We need an internetwork that allows us to probe traffic in any of its networks such that we check that the IP forwarding algorithm holds. The IP forwarding algorithm that we want to check is that explained in section 3.2.4 of the textbook; for convenience, we reproduce here that algorithm:

```
if (NetworkNum of destination = my NetworkNum) then
  deliver packet to destination directly
else
  deliver packet to default router
```

Fig. 1. Basic IP Forwarding Algorithm (IPFA)
From Computer Networks Ed.5, ©2012 MKP, Prof. Peterson and Davie, pg.217

This form of the algorithm is the simplest, it assumes that the stations (hosts) used have a unique NIC installed and configured and that their *forwarding tables* contain a single *default router*. For the time being

+ Questions, so far

