SAPIENZA
UNIVERSITÀ DI ROMA

Network Infrastructures

A.A. 2019-2020

Prof. Francesca Cuomo

About the course (1/2)

- Lecture Time
  - **Corso per MARR-MINR-TLC**
  - Giovedi 08:00-10:00 Aula 205, Marco Polo
  - Vanerdi 14:00-17:00 Aula 205, Marco Polo
  - **Corso per Cybersecurity**
  - Martedi 14-16 Aula II (CU002, Piano terra statistica)
  - Mercoledi 10:00-13:00 Aula 1 Ingegneria via Castro Laurenziano

- Prerequisite
  - Fundamentals of digital communications
  - Basic Understanding of Computer Networking (including IP/TCP suite)
  - Linux OS
  - Programming in C/C++, Matlab

About the course (2/2)

- Offered to:
  1. Cybersecurity
  2. Ingegneria Informatica (Computer Engineering)
  3. Artificial Intelligence and Robotics
  4. Ingegneria delle Comunicazioni
  5. Data Science

  – Need to have common basics: Recalls on fundamentals of digital communications and Computer Networking (including IP/TCP suite)

Course description

- This course will develop fundamental concepts, protocols & architectures for the description of the current network infrastructures: specific attention will be given to the broadband and optical networking
- Broadband networking driven by the imminent convergence of telephony (voice), Internet (data), cable (video), and wireless networks.
- Fundamental issues will deal with telephone, IP networking, optical networks, wireless access, Quality of Service
- Convergence architectures: ATM, Internet, MPLS, WiMax and LTE-A, xDSL

Issues

- Review on Telephone networks, TCP/IP networks, LAN/MAN technologies
- Access network
  - Copper based broadband access networks
  - ADSL and VDSL, networking solutions
  - Fiber based: PON and relevant extensions
  - Free-space-optical network
  - Metro Ethernet/Gigabit Ethernet
  - Multihop/3G/4G wireless data
  - Wi-xx family (WiFi, WiMax and mesh networks)
  - Radio based: **LTE** and **5G**
- Core network
  - Optical networking concepts
  - Optical link layers (SONET, WDM)
  - Optical Transport Network based on DWDM: single link characterization, optical components and devices, systems and networks
  - GMPLS
  - High-speed switching & router-design
  - Quality of service (QoS) building blocks and architectures
  - Traffic engineering (MPLS, ATM)
  - Evolution of the control plane (SDN, **Openflow**)

Reference material

- Class will be based on lecture slides and research papers on the topic

- Slides on the web site: https://sites.google.com/a/uniroma1.it/francescacuomo

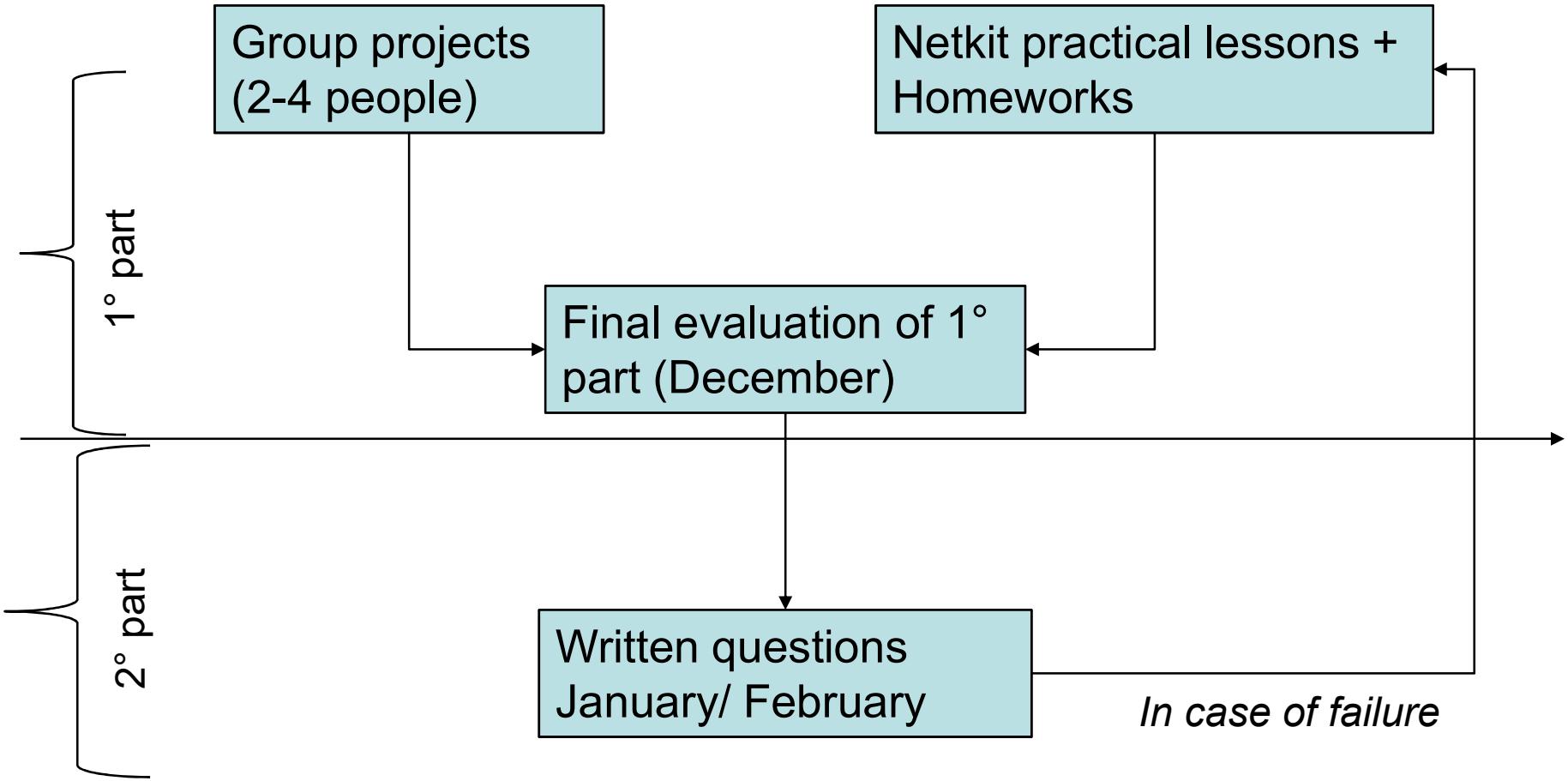
- Some technical papers suggested by the teacher
- Some technical papers found by the students (you have to perform a short thesis and the relevant presentation to the class)!

Google group and maling list

- We use a Course Mailing List based on a Google Group
- **Mailing list A.A. 2019/20**
- Gruppo Google Studenti MARR-MINR-TLC
- Gruppo Google Studenti CYBERSECURITY

- All the information and news during the course will be given in the mailing list.

Exam


Group projects
(2-4 people)
Netkit practical lessons +
Homeworks
1° part
Final evaluation of 1°
part (December)
2° part
Written questions
January/ February
In case of failure

Reference material

- Most communications will be handled by email and through the website
- Have your email address current – I will expect you to read emails about the class
- Course handouts and slides will be posted on website or shall be requested to the instructor via e-mail
- Research papers will be posted on the website

Contacts

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