DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE

800 ANNI 1222·2022

UNIVERSITÀ DEGLI STUDI DI PADOVA

SIGNET
signet.dei.unipd.it

ICT for Industrial Applications (ICT4IA)

Master degree on ICT for Internet and Multimedia Engineering (MIME)

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SIGnals and NETworking research group

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A course of a kind…

Academic Lectures

Industrial Seminars

Lab Experiences

Course's goals

Vision

- Upcoming ICT: emerging technologies, trends, application scenarios, challenges
- Hardcore ICT: embedded systems
- Softcore ICT: flexible, dynamic and self-adaptable networks and services

Application domain

- 5G systems, Extreme Environments, Distributed machine learning, …
- Embedded systems for automotive applications
- Internet of Things scenarios
- ICT for e-health

Hands on

- Homework & Final-course projects
- AURIX board lab
- SDN programming
- Python programming

Syllabus

1a. ICT scenarios & technologies [12h]

Introduction: the role of ICT in industrial sectors (Internet, IoT, Edge Computing, Machine Learning, 5G) and a look at future challenges

1b. Visit to SMACT competence center

1c. Wireless access for industrial applications

5G and B5G for industrial scenarios

Syllabus (cont)

2. ICT for automotive industry [12h]

Introduction to AURIX board for automotive applications

Embedded programming lab: connect sensors, read data, process data, actuate actions

ICT in automative: CANbus system

Syllabus (cont)

3. IoT services [6h]

Powering Business Worldwide

At Eaton, "we make what matters work" is a mindset.

IoT lab: *installation of MQTT broaker and Clients. Connection of sensors, data collection, data processing, realization of basic automation services*

Syllabus (cont)

4. Intelligent networks [10h]

The role of the Internet eXchange

Visit to UNIPD IX

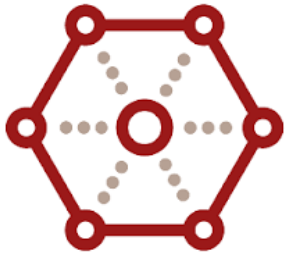
Software Defined Networks: the new frontier of networking

SDN lab: *Realization of an emulated SDN, with controller, differentiation of flows, …*

Visit to datacenter

Syllabus (cont)

5. ICT in e-Health [8h]



ICT for e-health: collection, processing, compression and estimation of biological signals

EEG lab: *experience of processing EEG signals*

WARNING

This is an **advanced course**!

We expect you to have **solid prior knowledge** on:

- **Networking**
  - IP, netmask, routing protocols, ISO/OSI model, …
- **Operating systems and Linux**
  - Kernel, su, ifconfig, ssh, ls, more, mkdir, ...
- **Programming**
  - ***C++, Python***

Don’t you have these competences?

- You’d better choose another course:
  - Internet
  - Programming for Telecommunications
  - (Programmable Hardware Devices)

Course Tools

- **E-learning website (moodle):**
  - Educational material, Homework, Mailing lists,…
  - ICT FOR INDUSTRIAL APPLICATIONS 23/24 (ICT4IA)
- **Aurix board:**
  - video tutorial (5’:16): install Aurix Development Studios (ADS) https://www.infineon.com/cms/en/product/promopages/aurix-video-hub/Video/aurix-development-studio-tutorials/
  - video tutorial (20’): https://youtu.be/fX9A80e7gz4
  - webinar (91’): https://youtu.be/SH03Kt6zypU
- **Mininets:**
  - Tutorial: https://github.com/scc365/tutorial-mininet

And now…

- what you all were waiting for…

Evaluation Method (aka EXAM!!!)

http://ganeshkamath89.blogspot.it/2012/02/do-exams-matter.html

Exam

Project-oriented tasks

- **4** intermediate **deliverables** with **hard deadlines**
  - 30% of the final grade each
- **Question-based test**
  - 30% of the final grade
- **Final project** on a specific topic
  - 40% of the final grade

Projects must be presented right after the course

Opportunity to continue the work as master thesis project!

Deliverables

- What's a deliverable?
  - Can take different forms, e.g., piece of software, report, presentation, …
- What if I miss a deadline?
  - Miss one deadline: you max grade will be cut to 25 out of 30.
  - **Miss two deadlines: you are out**! No exception, sorry.
- How are deliverables evaluated?
  - *Peer-review*: students correct each-other work, providing comments and suggestions
  - Teacher checks fairness and correctness of peer-reviews

Question-based test

- 3-4 questions on each of the modules developed during the course
  - Check knowledge of most important concepts-methodologies-commands
- What if I fail it?
  - Too bad…
  - See later

Final Project

- What's a final project?
  - A *team work* with a certain goal
- Which kind of goal?
  - Activities related to the course's subjects
  - e.g., study of a cutting-edge topic, design of a new service, development of an application, …
- How will it be evaluated?
  - Professor evaluates accuracy, completeness, technical soundness of the proposed solution, clarity of the documentation/code, comprehension of the problems, clarity of the presentation, capability of properly answering questions

What if I fail any part of the exam?

- You can opt for an **oral exam**
  - Questions can cover the entire course content
    - Possibly with practical tasks mimicking the lab experiences
      - Not the easiest way to pass the exam…

Etiquette & rules

emailing

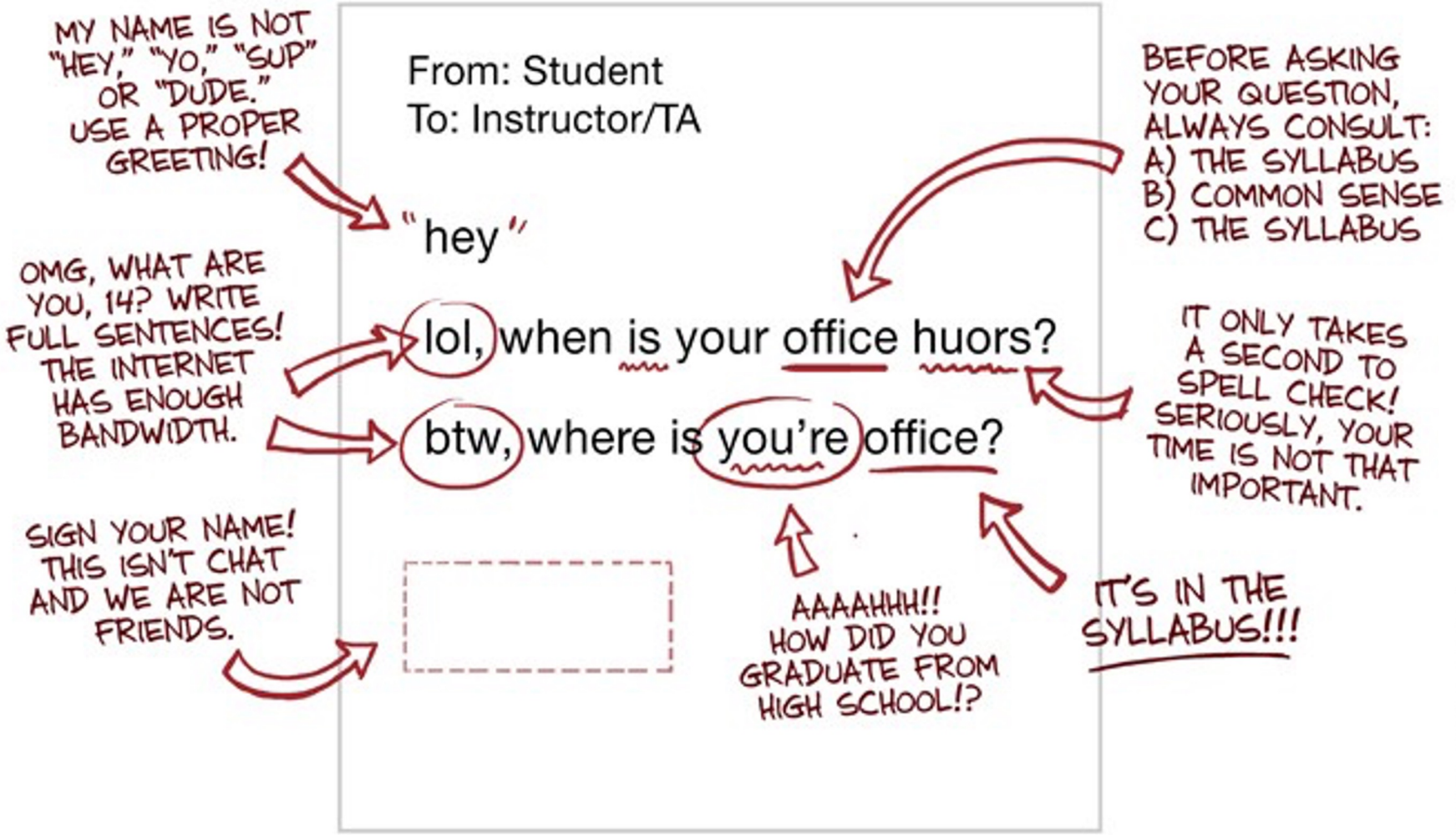
Before emailing

- Check the website to see if the info is already there
- Check the forum
- Ask your classmates

When emailing

- Use your University account
- Write in English and start the subject with **[ICT4IA]**
- Don’t write for long explanations:
  - First, discuss the matter with your classmates to see if the doubt is only yours or shared
  - Second, if the question is of general interest, ask during the lecture, since the answer may be of interest for many
  - Last option, ask for an appointment to discuss the matter in person

HOW TO WRITE AN E-MAIL TO YOUR INSTRUCTOR OR T.A.



After you emailed me…

- Wait the reply for a e reasonable time
  - which is more than 1’ :-)

- If you don’t get any answer, write again...

Questions?


KEEP
CALM
AND
LET'S
GET
STARTED