ICT for Industrial Applications (ICT4IA)

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

Andrea Zanella (zanella@dei.unipd.it)
Office number: (049 827)7770

SIGnals and NETworking research group
Contacts

• Prof. Andrea Zanella
  • e-mail: andrea.zanella@unipd.it
  • Phone: 049827 - 7770
  • Office n. 223 (DEI/A)
  • Office hours: upon request by email

• Eng. Simone Friso
  • Email: simone.friso@unipd.it
  • Phone: 049 827 7764
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
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 automotive: CANbus system
At Eaton, “we make what matters work” is a mindset.

**IoT lab:** installation of MQTT broker 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*
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
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)
  • video tutorial (20’): [https://youtu.be/fX9A80e7gz4](https://youtu.be/fX9A80e7gz4)
  • webinar (91’): [https://youtu.be/SH03Kt6zypU](https://youtu.be/SH03Kt6zypU)

• **Mininets:**
  • Tutorial: [https://github.com/scc365/tutorial-mininet](https://github.com/scc365/tutorial-mininet)
And now…

• what you all were waiting for…

Evaluation Method (aka EXAM!!!)
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

KEEP CALM & FOLLOW THE 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.

From: Student
To: Instructor/TA

MY NAME IS NOT “HEY,” “YO,” “SUP” OR “DUDE.” USE A PROPER GREETING!

OMG, WHAT ARE YOU, 14? WRITE FULL SENTENCES! THE INTERNET HAS ENOUGH BANDWIDTH.

“hey”

lol, when is your office hours?

btw, where is you’re office?

AHAHAHAH!! HOW DID YOU GRADUATE FROM HIGH SCHOOL!?

BEFORE ASKING YOUR QUESTION, ALWAYS CONSULT:
A) THE SYLLABUS
B) COMMON SENSE
C) THE SYLLABUS

IT ONLY TAKES A SECOND TO SPELL CHECK! SERIOUSLY, YOUR TIME IS NOT THAT IMPORTANT.

IT’S IN THE SYLLABUS!!!
After you emailed me…

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

• If you don’t get any answer, write again…
Questions?
KEEP CALM AND LET'S GET STARTED