

PHYS-459

Metrology II

Mari Daniele, Tkalcec Vâju Iva

| Cursus | Sem. | Type |
|-----------------------------------|----------|------|
| Materials Science and Engineering | MA2, MA4 | Opt. |

| | |
|----------------------------|-----------------|
| Language of teaching | English |
| Credits | 2 |
| Session | Summer |
| Semester | Spring |
| Exam | Oral |
| Workload | 60h |
| Weeks | 14 |
| Hours | 2 weekly |
| TP | 2 weekly |
| Number of positions | |

Summary

This course is a practical introduction to classical measurement techniques in a laboratory. The aim is to familiarise the students with data acquisition, sensors, signal processing, vacuum technology, automatic control. Some experiments of materials science are chosen as examples.

Content

- I Electrical circuits, Bode diagrams, filters
- II Transducers and sensors (Force, displacement, temperature)
- III Thermal sensors and regulators

Keywords

electrical circuits, sensors, automatic control, signal processing, analogic signals, digital signals, vacuum, labview

Learning Outcomes

By the end of the course, the student must be able to:

- Assemble a setup for measuring physical observables
- Sketch graphically the result of a measurement
- Use a measurement device
- Justify the advantage of an experimental setup
- Realize a measure chain for a sensor
- Illustrate how a sensor works
- Make a calibration

Transversal skills

- Use a work methodology appropriate to the task.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Identify the different roles that are involved in well-functioning teams and assume different roles, including leadership roles.
- Resolve conflicts in ways that are productive for the task and the people concerned.
- Take responsibility for health and safety of self and others in a working context.
- Collect data.
- Access and evaluate appropriate sources of information.

- Assess progress against the plan, and adapt the plan as appropriate.

Teaching methods

Hands on tutorial classes in groups of 4-5 students working on a bench

Assessment methods

Oral exam while assembling of an experimental setup

Supervision

| | |
|--------------|-----|
| Office hours | Yes |
| Assistants | Yes |

Resources

Websites

- <http://Http: moodle site with all documentation and course slides>