MICRO-429

Metrology practicals

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Cursus	Sem.	Type
Microengineering minor	E	Opt.
Microtechnics	MA2, MA4	Opt.
Minor in Imaging	E	Opt.
Quantum Science and Engineering	MA2, MA4	Opt.
Space Technologies minor	E	Opt.

Language of teaching	English
Credits	3
Withdrawal	Unauthorized
Session	Summer
Semester	Spring
Exam	During the semester
Workload	90h
Weeks	14
Hours	**3 weekly**
TP	3 weekly
Number of positions	

It is not allowed to withdraw from this subject after the registration deadline.

Remark

Ces TP sont optionnels et ne peuvent être suivis qu'en parallèle du cours MICRO-428 Metrology

Summary

The student will get familiar with the techniques learnt in class (MICRO-428) and will put them to practice with experiments in the laboratory. There will be a practical training for each theme covered in class; the students will also learn good practices during measurements (lab notebook included).

Content

The topics covered by the course are summarized as follows:

- Introduction
- Dark count rate (DCR) and afterpulsing statistics in photon-counting device
- Sensitivity in photon-counting devices
- Timing jitter measurements in single-photon detectors
- Scanning electron microscopy
- Atomic force microscope

Keywords

SPAD, TCSPC, PDP, PDE, SPTR, CTR, DCR, AFM, SEM, optical microscopy

Learning Prerequisites

Required courses

MICRO-428 *Metrology*

Recommended courses

Design of Experiments

Important concepts to start the course

Matlab for data read-out and processing

Learning Outcomes

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

- Choose an appropriate measurement methodology
- Develop the understanding of measurement tools and instruments
- Design a measurement experiment
- Interpret measurement results
- Investigate issues related to the accuracy and precision

Transversal skills

- Demonstrate the capacity for critical thinking

Teaching methods

Two introductory lectures followed by lab practicals in the second half of the semester.

Expected student activities

Mandatory advance preparation before each lab practical
Experimentation and note taking/description (lab notebook)
Interaction with the Lecturers and TAs

Assessment methods

Continuous assessment for each lab practical

Supervision

Office hours	Yes
Assistant.e.s	Yes

Resources

Notes/Handbook

On Moodle: handouts of all practicals available after the Introductory lecture.

Moodle Link

- https://go.epfl.ch/MICRO-429