MICRO-453

Robotics practicals

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Cursus	Sem.	Type
Robotics, Control and Intelligent Systems		Opt.
Robotics	MA2, MA4	Obl.

Language of teaching	English
Credits	2
Withdrawal	Unauthorized
Session	Summer
Semester	Spring
Exam	During the semester
Workload	60h
Weeks	14
Hours	**2 weekly**
Practical work	2 weekly
Number of positions	

Summary

The goal of this lab series is to practice the various theoretical frameworks acquired in the courses on a variety of robots, ranging from industrial robots to autonomous mobile robots, to robotic devices, all the way to interactive robots.

Content

The practicals can include the following topics:

- **Teaching Robots to Accomplish a Manipulation Task**
- **Experimenting with haptic interfaces**
- **Controlling a serial robot ABB IRB 120**
- **Control of the Micro Delta Direct Drive robot**
- **LiniX, linear axis, assembly and control**
- **Franka robot, programming by teaching**
- **Programming and characterization of a modular fish robot**
- **Tangible Human-Swarm Interaction using ROS**
- **Artificial Muscles**
- **ROS basics**
- **Integrated barometer/GNSS height determination on a UAV**
- **EMG control of a robotic Hand**
- **Noise**
- **2DOF Helicopter control**

WARNING: These practicals have a limited number of places, due to the heavy equipment used, students following the master in robotics will have priority in the attribution of places.

Keywords

industrial robotics, haptics, autonomous robots, manipulation, navigation

Learning Prerequisites

Required courses

Basics of mobile robotics
Introduction to automatic control
Introduction to signal processing

Important concepts to start the course

Robotics
Programming
Automatic control
Signal processing

Learning Outcomes

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

- Assess / Evaluate the performances or a robotic system
- Synthesize a control system
- Discuss the performances of a system
- Elaborate the model of a system

Transversal skills

- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Use a work methodology appropriate to the task.
- Collect data.
- Write a scientific or technical report.

Teaching methods

Students attend a set of practicals by groups of two or three, supervised by an assistent.

Expected student activities

Preparation of the practicals before attending it, writing of the rreport after the practical.

Assessment methods

Written report and oral feedback during the practical

Supervision

Office hours	No
Assistants	Yes
Forum	No

Resources

Moodle Link

- https://go.epfl.ch/MICRO-453