

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 Session	Unauthorized Summer
Semester	Spring
Exam	During the semester
Workload	60h
Weeks	14
<b>Hours</b>	<b>2 weekly</b>
Practical work	2 weekly
<b>Number of positions</b>	

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

**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**

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**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 of 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 assistant.

### Expected student activities

Preparation of the practicals before attending it, writing of the report 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>