MICRO-450 **Basics of robotics for manipulation**

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Cursus	Sem.	Type
Robotics	MA1, MA3	Obl.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Written
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	3 weekly
Number of positions	

Summary

This course introduces the basics of robotics for manipulation. The aspects concerning robot architectures (Serial , Parallel and Cartesian), sensors, kinematics and dynamic modelling and control are presented. Each of these theoretical topics is i concern with a industrial context.

Content

Introduction to robotics and applications

- History
- Types of robots
- Fields of applications
- Parallel robots

Modeling

- Solid body kinematics
- Direct and inverse coordinate transformation
- Jacobians
- Dynamics

Basics of robotics control

- Control strategies and overall architecture
- Trajectory generation (interpolation and dynamic profiles)

Components

- Sensors
- Actuators
- Man-machine interface

Keywords

Robotics, Modeling, Kinematics, Dynamics, Control

Learning Prerequisites

Recommended courses

Control theory

Learning Outcomes

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

- Choose or select robot, actuators and sensors
- Use knowledge in kinematics
- Design a robotc controller
- Apply theoretical knowledge (measurement, dynamics and kinematics) to robotics
- Optimize the design of a robot
- Establish different robot models (kinematics and dynamics)

Transversal skills

- Give feedback (critique) in an appropriate fashion.
- Access and evaluate appropriate sources of information.
- Manage priorities.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Plan and carry out activities in a way which makes optimal use of available time and other resources.

Teaching methods

Course ex cathedra + exercices

Assessment methods

written exam

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

Resources

Bibliography

Lecture notes- available in PDF - on moodle

Moodle Link

- https://moodle.epfl.ch/course/view.php?id=155