MICRO-451 **Applied and industrial robotics**

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Cursus	Sem.	Type
Microengineering minor	E	Opt.
Microtechnics	MA2, MA4	Opt.
Robotics	MA2, MA4	Opt.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	Oral
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

This course is a real contact with industrial robotic applications. Components and mechanisms are reminded. The fields of microtechnical assembly and packaging are treated. CTOs from established companies (BlueBotics, Adept, Maxon motors and UniTechnologies) are involved in this course.

Content

Components and mechnaisms:

- Dynamic behavior
- Materials
- Guides, transmissions
- Flexible guides

Applications:

- High precision robots and Micro-actuators
- Micro-robots
- Peripherals

Industrial key note talks (year dependant)

- Industrial micro assembly (concepts and machines)
- Frequesncy analysis and characterization of a robotic machine iin nidustry.
- Industrial applications and cost evaluation
- Actuation technology and application

Keywords

Robotics, Micro Robotics, Mechanisms, Robotic assembly, Applications, Industrial Robotics,

Learning Prerequisites

Required courses

Basics of Robotics
Basics of control
MICRO 450 (Basics of robotics for manipulation)

Recommended courses

Basics of Robotics for manipulation, Vibration Systems, Control and advanced control, Conception de mécanismes I et II

Learning Outcomes

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

- Argue the choice of components or industrial robots for given applications.
- Choose or select an appropriate assembly technique or a robot.
- Design an industrial robotics installation
- Judge the quality of a mechanism or a peripheral element in robotics
- Assess / Evaluate the choices made
- Specify economic challenge of an industrial robotics installation
- Assess / Evaluate the cost of an industrial robotics installation
- Use theoretical knowledge to support the specifications of an industrial application

Transversal skills

- Assess progress against the plan, and adapt the plan as appropriate.
- Give feedback (critique) in an appropriate fashion.
- Identify the different roles that are involved in well-functioning teams and assume different roles, including leadership roles.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Access and evaluate appropriate sources of information.
- Manage priorities.
- Communicate effectively with professionals from other disciplines.

Teaching methods

Course ex cathedra + exercices + sub project + keynote talks

Expected student activities

Exercice + subproject company visit

Assessment methods

Midterm
+ subproject report
+ Written exam

Supervision

Office hours	Yes
Assistant.e.s	Yes
Forum	Yes
Others	Slack (to be decided)

Resources

Notes/Handbook

Lecture notes- available in PDF - on moodle

Moodle Link

- https://go.epfl.ch/MICRO-451