EPFL

MICRO-515   **Evolutionary robotics**

Floreano Dario

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

Language of teaching	English
Credits	3
Withdrawal	Unauthorized
Session	Summer
Semester	Spring
Exam	Written
Workload	90h
Weeks	14
Hours	**3 weekly**
Lecture	2 weekly
Exercises	1 weekly
Number of positions	**60**

Il n'est pas autorisé de se retirer de cette matière après le délai d'inscription.

Summary

The course describes theories, methods, and technologies for designing robots and artificial systems inspired by evolution, development, and learning. It also shows how robotic models can help to understand biological systems. The course ends with a discussion of future bio-hybrid robots.

Content

- Natural and Artificial Evolution
- Evolutionary Computation and Applications
- Evolution of Neural Systems
- Advanced Evolutionary Algorithms
- Evolutionary Robotics
- Developmental Systems
- Evolution of Collective Systems
- Edible robotics
- Bio-hybrid robots

Learning Prerequisites

Important concepts to start the course

Programming skills (Phython, Java, C++)

Learning Outcomes

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

- Apply new tools for software and hardware engineering
- Translate acquired theoretical knowledge in practical implementations during laboratory sessions

Teaching methods

Lectures, software exercises, and exercises and project involving 3D printing, assembly, programming, and

characterization of modular robot with neural controller.

Expected student activities

Attending lectures, asking critical questions, taking all exercises and completing assignments for the following week, forming groups and performing collaboratively project woth physical robots, writing and presenting project results

Assessment methods

Mini-project report/presentation + written exam

Supervision

Office hours	No
Assistants	Yes
Forum	Yes

Resources

Bibliography

Floreano, D. & Mattiussi, C. (2008) Bioinspired Artificial Intelligence. MIT Press (selected chapters)

Ressources en bibliothèque

• Bioinspired Artificial Intelligence / Floreano

Moodle Link

• https://go.epfl.ch/MICRO-515