

ENV-530

**Sustainability robotics**

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Cursus	Sem.	Type
Environmental Sciences and Engineering	MA2, MA4	Opt.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	Written
Workload	90h
Weeks	14
<b>Hours</b>	<b>3 weekly</b>
Lecture	2 weekly
Exercises	1 weekly
<b>Number of positions</b>	

**Summary**

The goal of this course is to provide methods and tools of robotics in promoting sustainable development. The course is a balance between theoretical basics in robotics, associated case studies and project based learning.

**Content**

**Introduction to Robotics:** Introduction to key concepts in Robotics. Application examples include environmental and field robotics and development trends in the academic and industrial community.

**Fundamentals of robotic systems:** System components of ground based and aerial robots (e.g. hardware, software, sensors, system architecture, microcontrollers). Modeling, scaling and design of aerial robots given operational and payload constraints.

**Project on robotics and AI for sustainability:** Definition of end user requirements, project planning and contextualisation within the UN Sustainable Development Goals. Group based execution and presentation.

**Keywords**

Artificial Intelligence, Robotics, Environmental Sensing

**Learning Prerequisites****Required courses**

None

**Learning Outcomes**

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

- Demonstrate knowledge of common robotics building blocks and architectures
- Explain the results of the mini project and contextualise it in larger robotics trends
- Recognize key robotics concepts and terminology
- Recognize and articulate the relationship between robotics and sustainability

**Transversal skills**

- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Communicate effectively with professionals from other disciplines.
- Keep appropriate documentation for group meetings.

- Demonstrate the capacity for critical thinking
- Manage priorities.
- Write a scientific or technical report.

### **Teaching methods**

Lectures, exercices session and a project

### **Assessment methods**

The final grade will be based on the evaluation of the report from the project (50%) and a written exam during the exam session (50%).

### **Resources**

#### **Moodle Link**

- <https://go.epfl.ch/ENV-530>