Summary
Self-driving cars, delivery robots, or self-moving segways. Most of these AI-driven transportation systems rely on four pillars: 1-Sensing, 2-Perceiving, 3-Predicting, and 4-Acting steps. Students will learn the fundamentals behind these four pillars, i.e., the technology behind autonomous vehicles.

Content
Introduction to AI-driven systems
2. Sensing modalities
3. Perceiving: how to extract meaningful information from raw data?
   - Intro to machine learning (fundamentals to regression and classification)
   - Intro to deep learning (Neural Network, CNN, regularization techniques)
   - State-of-the-art techniques for localisation, detection, and tracking objects in the context of autonomous vehicles.
4- Predictive models
   - Intro to Recurrent Neural Networks
   - Learning to clone socially-accepted human behavior
5- Acting: challenges and ethical impacts

Students will implement perception tasks for autonomous vehicles and participate to a human-robot tandem race.

Keywords
Deep Learning, Autonomous Vehicle, Artificial intelligence, Machine learning, Self-driving car

Learning Prerequisites
Required courses
Fundamentals in Analysis, Linear algebra, Probability and Statistics.
Programming skills.

Learning Outcomes
By the end of the course, the student must be able to:
• Define the fundamental steps behind an AI-driven system
• Design the building steps of an autonomous vehicle
• Implement an algorithm for each step
• Explain and understand the challenges and ethical impacts
Teaching methods
Ex cathedra

Assessment methods
- Lab projects (in group): 30%
- Midterm: 30%
- Final project (in group): 40%