Class organization and structure

Basic Information

- Instructors: Dr. Andrea Censi, Dr. Jacopo Tani

  - + guest lecturers

- Online book ("The Duckiebook"): https://docs.duckietown.org/daffy/

- Class website: https://idsc.ethz.ch/education/lectures/duckietown.html

- Appointments: All classes will be on Zoom unless otherwise specified

  - **Lectures**: Mondays 14-16: Zoom

    - https://us02web.zoom.us/j/83590829006

  - **TA support**: Wednesdays 10-12: Zoom

    - https://us02web.zoom.us/j/83892113355

- Available duckieTown (subject to Covid restrictions): ML K 31

  - Only 4 people, with masks, at the same time

  - MUST book before showing up

Hardware information

- Every student: will receive a Duckiebot and materials to build a 3x3 city loop at home

- Space Requirements: you will require ~2x2 meters of available floor space for the city

  - Cities can be shared to do exercises

- Network Requirements: you will require admin access to your home network

  - We will not be able to offer support on specific network configurations

Staff

**Lead Assistant:**

Aleksandar Petrov <alpetrov@ethz.ch>

Teaching Assistants:

|	
David Oort	oodavid@student.ethz.ch
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Projects

- Due to the current Covid19 situation we cannot guarantee access to the more complex city infrastructure in ML K 31 throughout the course.

- Projects will not be a (graded) component of this edition of AMoD

- We will encourage "deep dives" in topics of interest, and support creation of novel autonomous behaviors that are not currently part of the Duckietown stack
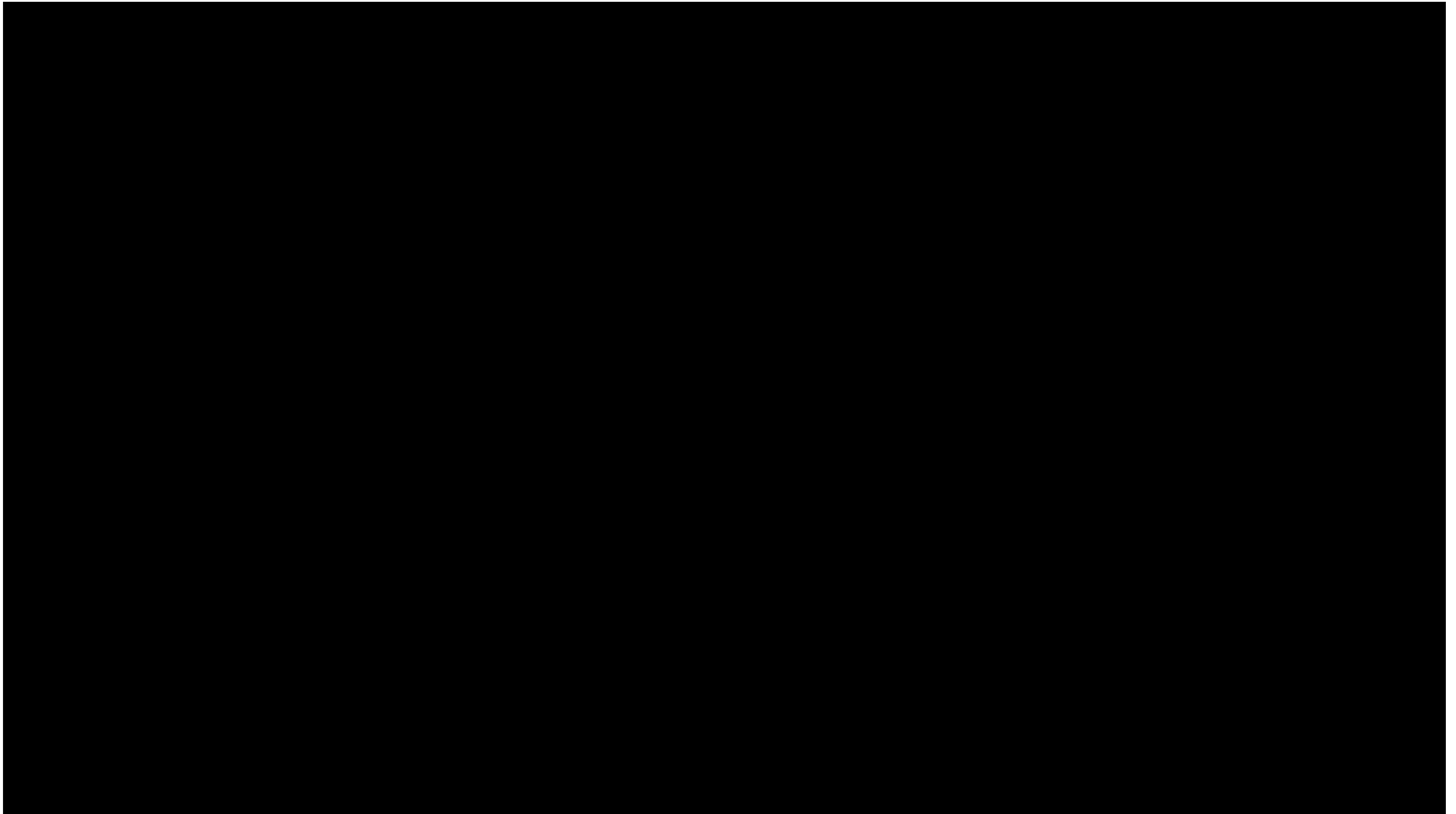
Example project videos
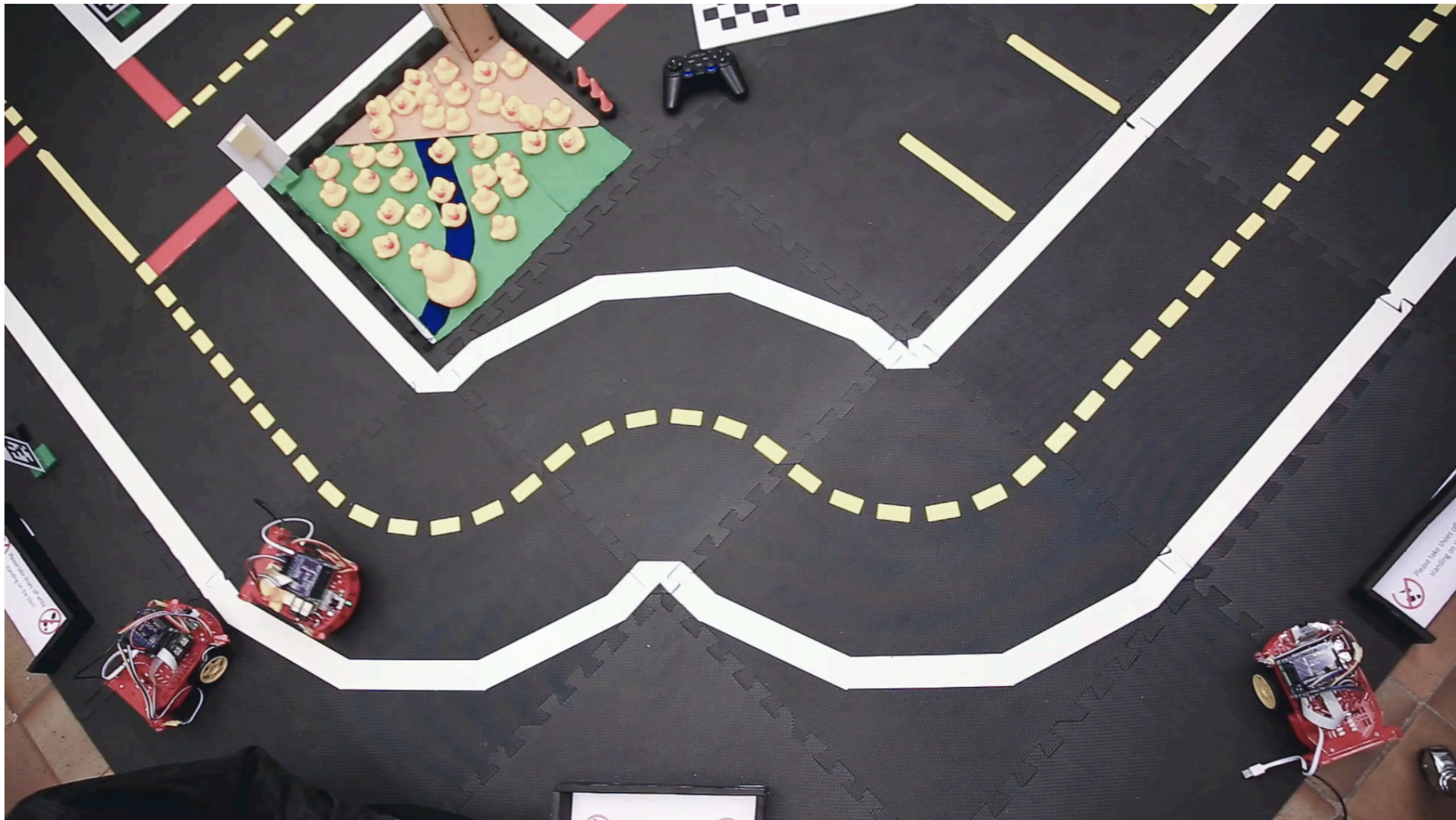
Lane filtering and control

Example project videos
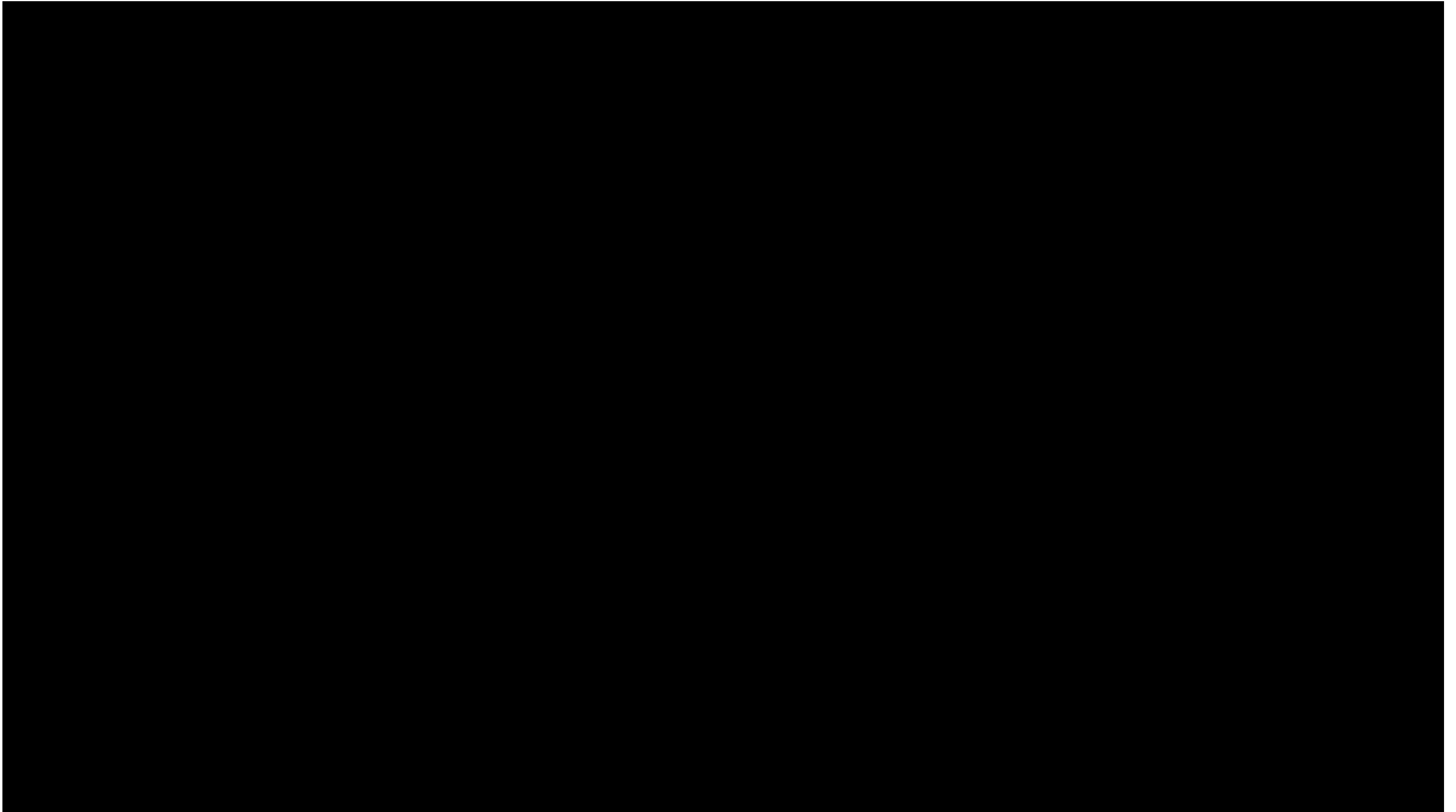
System Identification

Example project videos

Autolab localization

Topics

#	Lecture
1	Course Introduction
2	Intro to Autonomy
3	Software architectures
4	Software development
5	Camera modeling and calibration
6	Perception / CV basic algorithms
7	Machine learning basics
8	Machine learning - perception

#	Lecture
9	Localization (Bayes filtering)
10	Lane filter
11	Dynamics modeling
12	Control
13	Planning
15	Imitation / Reinforcement Learning
16	Autonomous Mobility on Demand

Grading Scheme

- Exercises - 100%

- Hardware exercises are going to be graded in our Autolab, following the AI-DO pipeline

- Time bank: each of you will have 15 days of personal "time bank" for late deliveries, throughout the course

Class admission criteria

Current Limit: 30 students

- **Skillset**: coding (ROS, Python, Linux, Git, Docker), hardware experience

- **Relevant background**: robotics, autonomy, controls, computer vision, machine learning, …

- **Prior experience**: past and current cool projects, Github code

- **Motivation**: dreams, fears, …

- **Diversity of the above**

- **Code:** your code will be public and become part of Duckietown

- **Recordings**: all classes will be on Zoom, and will be recorded

Questionnaire: will send you link by email

Deadline: Friday 23:59

Final selection announcement: over the weekend. Classes start on Monday.