

**L1: Introduction**

- Rules, safety
- Semester program, expectations, rules
- Matlab tutorial ([https://github.com/tassos/matlab\\_tutorial](https://github.com/tassos/matlab_tutorial))
- Robotic toolbox introduction. Go through some functions in the rtbdemo

**L2: Coordinate systems**

Exercises on paper  
Exercises in Matlab Robotics Toolbox

**L3: Direct geometric model – classical approach**

Exercises on paper  
Exercises in Matlab Robotics Toolbox

**L4: Direct geometric model – DH approach**

Exercises on paper  
Exercises in Matlab Robotics Toolbox

**L5: Inverse geometric model**

Exercises on paper  
Exercises in Matlab Robotics Toolbox

**L6: Dynamic models for Robot arms**

Exercises on paper  
Exercises in Matlab Robotics Toolbox  
Exercises in Simulink – Zoly Robot example

**L7: Test + (back-up time for previous labs)**

**L8: Android HW Boards – practice exercises (part I)**

**L9: Android HW Boards – practice exercises (part II)**

**L10: PID Controllers for hardware-in-the-loop**

Design the controllers for Zoly Robot example (design method 1)  
Implement the controllers on the Android HW boards  
Run in real-time

**L11: PID Controllers for hardware-in-the-loop**

Design the controllers for Zoly Robot example (design method 2)  
Implement the controllers on the Android HW boards  
Run in real-time  
Study Disturbance rejection capabilities  
Trajectory generation and tracking

**L12: Mobile Robot HIL example - quadcopter**

Dynamic model of quadcopter  
Controller design (multiple PID loops or state feedback)  
Implement the controllers on the Android HW boards  
Run in real-time

**L13: FANUC Robot**

Programs on the remote for executing simple tasks  
Trajectory generation

## **L14: Recovery lab**