OPTION _S8 **Spring Semester** **Graduate**	**Option S8**	**6 credits** **Individual work: 50%** **Group work: 50%**
Prerequisite: none		

DA_2802	**Drones**	**Language** 
Lecture: 36		**Lab work: 28**

This elective course is an introduction to the design, realization, instrumentation and remote control of drones. These techniques could be generalized to other autonomous mechatronics systems.

Contents

- Notions of mechanics
- Aerodynamics
- Motorization
- Sensor specifications (accelerometer, gyroscope, magnetometer, GPS…)
- Sensor data fusion (Complementary or Kalman filter)
- Control (PID, multivariable)
- Microcontroller (STM32 family)

Laboratory project

- Testing a pre-built quadcopter drone
- Acquisition (I2C/SPI protocols) and processing of sensors data (accelerometer, gyroscope, magnetometer…)
- Generation of PMW control signals for motors
- Dynamic modeling and simulation with Matlab/Simulink
- Feedback and PID control

Textbook

Fundamentals of Inertial Navigation, Satellite-based Positioning and their Integration, A. Noureldin, T**. Karamat,** J. **Georgy**, **SPRINGER**