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# Mechatronics

## Finalità

The course is intended to provide an integrated introduction to the design of computer-controlled electromechanical systems. The central focus of this course will be the completion of a team-based project, to be tested in an in-class demonstration during the final week of the course.

## Programma

Introduction to automatic machine control.  
Boole's Algebra  
Hard-wired control and programmable logic control.  
Fourier and Laplace Transforms.  
Transfer function.  
Stability  
PID regulation  
Axis control.  
Sensors and transducers,  
Amplifiers.  
Filters.  
A/D and D/A converters.  
PLC: languages  
PLC: programming tools.  
PC as control units  
Software SCADA  
Distributed automation: fieldbus (PROFIBUS, CANBUS, MODBUS)  
Ethernet as fieldbus  
Operating systems and automation: real time operating systems.  
Industrial automation and security requisites.

## Attività d'esercitazione

- Decoder 3-8 T4HCT 138.
- A simple driver for stepper motor.
- Converter D/A.
- Axis control for PC.
- Programming PLC.
- PC/PLC interface.
- Programming a simple SCADA.
- Using a real time operating system.

## Modalità d'esame

The examination is made up by a project that simulates an industrial automation application and by an oral discussion about.

The active participation to lectures and other activities is evaluated.

## Propedeuticità

None.

## Testi consigliati

H. JACK: "Integration and Automation of Manufacturing Systems", available at <http://claymore.engineer.gvsu.edu/~jackh/> under GPL license.