

## DEA-TEL-524 Electronics Instrumentation

**SEMESTER:** Spring

**CREDITS:** 3 ECTS (2 hrs.per week: 1 Theory + 1 Lab, on average)

**LANGUAGE:** Spanish

**DEGREES:** MIT

### Course overview

This course is an introduction to sensors and conditioning circuits used in electronics instrumentation, tailored for students with a quite extended knowledge of basic analog electronics and signal and systems analysis.

### Prerequisites

A solid basic knowledge of analog electronics circuits and devices is needed for this course, as well as signal theory and circuit analysis. In details, the student should be confident with:

- Concept of amplification, amplifier, input and output impedance;
- Frequency response, Bode plots, time-frequency relationship;
- Operational amplifier model and operation.

### Course contents

#### Theory:

1. Sensor classification and matching conditioning systems.
2. AC conditioning and precision converters.
3. Definition of accuracy, errors, linearity.
4. Advanced conditioning systems (lock-in, chopping, etc.)

#### Laboratory:

After each theoretical block the student will design, build and analyze a simple system based on the principles recently seen.

The students are supposed to do personal research to delve into the subject, to choose a sensor, and to present a complete application.

## Textbook

- R.F.Coughlin, F.F.Driscoll, Operational amplifiers & Linear integrated circuits. 6ª Edición, Prentice Hall

## Grading

- A final written test, individual, consisting of a design of a measurement system. (40%, with a minimum mark of 4/10)
- Group presentation a laboratory practice and individual tests. (60%; up to 2 tests, each one of them will be weighted 50/50 between an individual written exam and a group laboratory report or presentation; the average must give a minimum mark of 5/10)