

# Analog electronics

**Titulaire**

François QUITIN (Coordonnateur)

**Mnémonique du cours**

ELEC-H402

**Crédits ECTS**

5 crédits

**Langue(s) d'enseignement**

Anglais

**Période du cours**

Deuxième quadrimestre

**Campus**

Solbosch

## Contenu du cours

Table of contents:

1. semiconductor basics
2. PN junction and diodes
3. MOSFET transistors
4. Single-stage MOSFET amplifiers
5. Differential amplifiers
6. BJT transistors and amplifier circuits
7. VLSI manufacturing technologies

## Objectifs (et/ou acquis d'apprentissages spécifiques)

**Specific skills**

Improve knowledge on

- > Semi-conductor physics
- > The internal details of electronic components (diodes, MOSFET, BJT, ...)
- > How to use basic components for amplifier circuits

At the end of the course, the student should be able to

- > understand the physics of semiconductor components
- > calculate the properties of circuits using semiconductor components, based on a biasing and a small-signal analysis
- > use the SPICE simulator
- > manipulate concepts related to the frequency response of the components
- > evaluate the imperfections of amplifier circuits in order to propose an adequate solution

## Méthodes d'enseignement et activités d'apprentissages

Lectures (24h=12x2h)

Labs (36h=9x4h) in groups of 2 to 3 students

- > learn to use the SPICE simulator by analyzing MOSFET amplifier circuits
- > learn to use the CAD software to design Printed Circuit Boards,
- > solder components on the PCB and test the PCB with lab equipment

## Références, bibliographie et lectures recommandées

**FLOYD TL**

"Électronique composants et systèmes d'applications"

*Editions Reynald Goulet***SEDRA/SMITH**

"Microelectronic Circuits"

*Oxford University Press***MANCINI R**

"Op-amps for every one"

[www.ti.com/lit/an/slod006b/slod006b.pdf](http://www.ti.com/lit/an/slod006b/slod006b.pdf)**CARTER B**

"Handbook of Operational Amplifier Applications"

[www.ti.com/lit/an/sboa092a/sboa092a.pdf](http://www.ti.com/lit/an/sboa092a/sboa092a.pdf)

## Autres renseignements

### Lieu(x) d'enseignement

Solbosch

### Contact(s)

Titulaire : François Quitin

Assistant responsable : Renaud Theunissen

## Méthode(s) d'évaluation

Autre

### Méthode(s) d'évaluation (complément)

- > The written exam evaluates both the lectures and the labs
- > The written exam is "open-book", students can use their notes
- > A lab exam is organized to evaluate the lab learnings, i.e. the student will have to use the SPICE software to analyze a

circuit. There is no second session mark for the lab exam, i.e. the first session mark of the lab exam will count for the final grade of the course.

### Construction de la note (en ce compris, la pondération des notes partielles)

The grade is split as follows: 1/3 on the lab exam, 2/3 on the written exam. There is no second session mark for the lab exam, i.e. the first session mark of the lab exam will count for the final grade of the course.

### Langue(s) d'évaluation principale(s)

Anglais

### Programmes

#### Programmes proposant ce cours à l'école polytechnique de Bruxelles

MA-IRCB | Master : ingénieur civil biomédical | finalité Spécialisée/  
bloc 1

