

## DIE-GITT-120 Electric Circuits

**SEMESTER:** Spring  
**CREDITS:** 6 ECTS (4 hrs. per week: 3 Theory + 1 Lab)  
**LANGUAGE:** Spanish  
**DEGREES:** GITT

### Course overview

This course provides an introduction to the basic concepts of modern circuit theory. Application examples taken from many electrical engineering subject areas are studied.

### Prerequisites

Students are assumed to have a basic understanding of electricity and magnetism.

### Course Contents

#### Theory:

1. **Preliminary concepts.** Current, voltage, power, and energy. Circuit elements. Kirchhoff's laws.
2. **Resistive circuits.** Equivalent resistance. Linearity. Thevenin's and Norton's theorems. Node equations.
3. **Circuits with capacitance or inductance.** Free and step response of a first order circuit. Initial conditions.
4. **A-C steady-state circuit analysis.** Impedance and admittance. Phasor diagrams.
5. **Applications.** Transducers: circuits to measure physical variables.

#### Laboratory:

Seven weekly two-hour sessions. Students explore laboratory measurement techniques using basic laboratory equipment (voltmeters, ammeters, oscilloscope,...).

### Textbook

- **C. M. Close.** *The Analysis of Linear Circuits*, Harcourt Brace Jovanovich Inc., New York (1966)

## Grading

There will be three midterm exams, a final exam and lab work. Final exam will be cumulative, although the bulk of the exam will cover material from the last ten weeks of class. The overall grade is obtained as follows:

- Midterm I will be during the 4th week: 10% of the final grade.
- Midterm II will be during the 8th week: 20% of the final grade.
- Midterm III will be during the 12<sup>th</sup> week: 10% of the final grade.
- Final exam will be taken during the finals period: 35% of the final grade.
- Lab work: 25% of the final grade.