

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL ENGINEERING
ABET COURSE SYLLABI

IEE2483 ELECTRONICS LABORATORY

Credits and contact hours: 5 UC credits / 5 hours (5h. Laboratory experiences)

Instructor's name: Enrique Álvarez

Course coordinator's name: To be defined

Textbook: Microelectronics Circuits, 6th Edition – A. Sedra y K. Smith

Course Catalog Description: This course allows the student to analyze, design, implement and test different circuits such as data converters (DAC and ADC), DC-DC converters, class A and class AB amplifiers, impedance measurement circuits and IR transmission circuits. Special emphasis is given to circuit analysis, the use of circuit simulators such as LTspice, and the proper use of laboratory instruments such as the oscilloscope, the power supply, the multimeter and the function generator. Additionally, this course comprises a final project consisting on the design and implementation of a laboratory power supply, so the student is exposed to the entire design flow typically used in any electric project.

Prerequisite Courses: IEE2413 Electronics; IEE2183 Electrical Measurements Laboratory

Co-requisite Courses: To be defined

Status in the Curriculum: Required

Course Learning Outcomes:

1. Learn how to use laboratory instruments typically used in the design and implementation of electronic circuits.
2. Design, implement and test electronic circuits of low-to-medium complexity using passive elements, operational amplifiers, MOSFETs, BJTs, diodes, etc.
3. Apply the theoretical knowledge acquire durign the undergraduate course of electronics.

Relation of Course to ABET Criteria:

- a. Knowledge of mathematics, science and engineering
- b. Design and conduct experiments: analyze and interpret data
- c. Design a system, component, or process
- d. Multidisciplinary teams
- e. Identify, formulate, and solve engineering problems
- g. Effective communication
- j. Recognition of the need for, and an ability to engage in life-long learning

Topics covered:

1. Experience 1 - Laboratory Instruments and Measurements
 - 1.1. Impedance measurement
 - 1.2. Lissajous curves
2. Experience 2 – Circuits with Transistors
 - 2.1. Common-source amplifier with resistive degeneration
 - 2.2. Common-emitter amplifier with resistive degeneration
3. Experience 3 - Signal Conditioning
 - 3.1. System design
 - 3.2. PWM synthesis
 - 3.3. Filter design
4. Experience 4 - Voltage Buffers
 - 4.1. Class AB amplifiers
5. Experience 5 – Data Converters
 - 5.1. Flash ADC
 - 5.2. R2R DAC
6. Experience 6 - Power Electronics
 - 6.1. Chopper Buck Converter
7. Project – Design and Implementation of a Power Supply