UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Laboratory of Electronics I

2425-1-F1701Q144

Aims

The aim of the course is to illustrate the various aspects related to the development of CMOS integrated circuits. The course consists of three separate but coordinated parts

- Concepts of analog design of CMOS integrated circuits
- (Introduction to the) Use of CADENCE software
- Introduction to laboratory equipment

Contents

- Concepts of analog design in CMOS technology
- Use of CADENCE software for simulation of CMOS analog circuits
- Concepts of electronic instrumentation for the characterization of integrated circuits

Detailed program

The course introduces the student to the development of a CMOS integrated circuit and consists of three parts:

- lectures on CMOS design. The following topics will be addressed: CMOS technology, analog switches, current mirrors, voltage and current references, gain stages, operational amplifiers.
- laboratory experiences for the use of CADENCE software for the design of analog integrated circuits. Examples of experiences: Design of a current mirror, of a bandgap reference, of a single and two-stage operational amplifier, of an analog filter.
- laboratory experiences for the knowledge of electronic instrumentation for the characterization of analog

integrated circuits

Prerequisites

Bachelor in physics or equivalent. Basic notions of analog electronics

Teaching form

Lectures and laboratory experience will be held in person.

Textbook and teaching resource

References:

A. Baschirotto “Dispense di Microelettronica”
Gray, Hurst, Lewis, Meyer, “Analysis and design on analog integrated circuits”
F. Maloberti, “Analog designfor CMOS VLSI systems”
B. Razavi, “Design of analog integrated circuits”
M. Norgia, R. Ottoboni, A. Pesatori, C. Svelto, “Misure - Dai fondamenti alla strumentazione”, Ed. Esculapio.
Nihal Kularatna, “Digital and Analogue Instrumentation: Testing and Measurement”, IEE.

Semester

1st semester

Assessment method

Oral examinations (colloquium) in presence on appointement (to be fixed via mail to andrea.baschirotto@unimib.it)
The student may present two Laboratory Reports based on:

1. Design and simulation of simple single transistor analog circuits;
2. Electrical and electronic measurements on simple circuit configurations.
   The exam will consist of:

- Colloquium on Laboratory Reports (if presented)
- Colloquium on topics covered during the lessons

Office hours

Discussions with prof. Baschirotto will take place upon appointment (contact via mail andrea.baschirotto@unimib.it).

Sustainable Development Goals

INDUSTRY, INNOVATION AND INFRASTRUCTURE