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# Fundamentals of electronics A

## Finalità

This module aims at introducing basic notions related to the operating principles of main semiconductor devices, to their application within digital circuits, to the architecture of digital systems, and to principal analysis and design methodologies.

## Programma

Semiconductors: main properties and characteristics.

pn junction, bipolar junction transistor, MOSFET: operating principles and behavioral models.

Introductory notions on integrated circuits fabrication technology.

Digital circuits: definitions, main parameters and figures of merit. Noise margins, regenerative properties. Dynamic behavior and propagation delays.

Bipolar digital circuit families: diode circuits, TTL, ECL.

MOS digital circuit families: nMOS, CMOS.

MOSFET as a switch: pass-transistor e transmission-gate logics.

Dynamic CMOS logic: P/E, Domino, SPCL, TSPCL.

I/O subsystems, output buffers.

## Attività d'esercitazione

Classroom exercises, concerning analysis and design of simple digital circuits.

## Modalità d'esame

The examination includes both a written test and an oral discussion. A positive result in the written test is necessary to get to the oral part. On-line registration is mandatory.

## Testi consigliati

J.M. Rabaey: "Digital Integrated Circuits, a Design Perspective", Prentice Hall

Millman, Grabel: Microelettronica, McGraw-Hill.

R. Menozzi, "Appunti di Elettronica", Pitagora.