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# Fundamentals of electronics B

## Finalità

Providing the students with basic knowledge of analog electronic circuits, with specific focus on linear amplifiers.

## Programma

- 1) Linearization and small-signal models – Linearity and distortion; linearization; small-signal model of the p-n diode; small-signal model of the common-emitter BJT; small-signal model of the common-source MOSFET.
- 2) Single-transistor amplifiers at low frequency – Network functions; common-emitter amplifier; common-collector amplifier; common-base amplifier.
- 3) Frequency-domain analysis of the common-emitter amplifier – Short-circuit current gain; open-circuit voltage gain; capacitive coupling.
- 4) Two-transistor amplifiers – Common collector – common emitter amplifier; common collector – common collector amplifier; Darlington amplifier; Cascode amplifier.
- 5) The differential amplifier – Ideal differential amplifier in bipolar technology; offset voltage; common-mode rejection ratio.
- 6) Ideal operational amplifiers – Feedback; stability of circuits with feedback; circuits with operational amplifiers.
- 7) Current sources and active loads – Current mirror in bipolar technology; Widlar current source; Cascode current source; Wilson current source; common-emitter amplifier with active load; differential amplifier with active load.

## Modalità d'esame

The test is made of a written test and an oral test. Students must pass the written test to be admitted to the oral test.

## Propedeuticità

Analisi matematica (ABC). Fisica generale (ABC). Elettrotecnica AB. Fondamenti di Elettronica A.

## Testi consigliati

R. Menozzi, “Appunti di elettronica: dispositivi ed elettronica analogica lineare,” Pitagora  
P. R. Gray, R. G. Meyer, “Analog Integrated Circuits,” Mc Graw Hill