Università degli Studi di Genova
Corso di Laurea in Ingegneria Elettronica
Corso di Diploma Universitario in Ingegneria Elettronica

Misure Elettroniche - Programma del Corso

a.a. 2001-2002 (I semestre)

Docente: Prof. Giacomo Mario Bisio

Objectives of development
To introduce students to the principles of measurement and instrumentation and enable them to apply the concepts and theory to the solution of a variety of engineering problems, in a twofold perspective: measurements for electronics, and electronics in meausurements.

Program of the course
Electromechanical instruments (permanent-magnet moving-coil, electrodynamic, elettrostatic; ohmmeter; potenziometric meausurements; dc and ac measurements). Voltage, current, and resistance electronic measuring instruments (multimeter, dc and ac measurement techniques). Oscilloscopes (analog and digital oscilloscope basics, probes). Power measurements. Frequency and time interval analyzers. Impedance measuring instruments (bridge methods, vector meters).
Transducer and sensors (classification, physical principles; mechanical and thermal sensing; piezoelectricity , Hall effect; transmission and calibration of sensor signals).
Measuring systems (functional description, classifications,characteristics of instruments). Virtual instruments. Basic metrology (measurements units, types of equipments and of measurements, calibration, expression of uncertainty in measurement).

Measurement techniques: noise (origins, noise figure, noise in electronic circuits); signal recovery (filtering and integration, phase sensitive detection, signal averaging, correlation techniques); noise reduction (interference, grounding, guarding and shielding, common-mode noise rejection).

Superconductive devices (physical principles, Josephson junction, SQUID, voltage standard).

Typology of activities
Lectures and laboratory activities. The grades will be determined by : (1) the evaluation of laboratory attendance(5/30); (2) an oral examination (25/30). It is possible to develop a short Lab project (up to 3/30 extra points).

Requirements
Basic knowledge of circuit theory is desirable.

Bibliography
- Lecture Notes, aa. 1998-99
- Bentley ,J.P. "Principles of Measurement Systems", Longman Scientific & Technical 3rd Ed.
- Coombs, Jr. C. F. (Ed.)"Electronic Instrument Handbook", McGraw-Hill 2nd Ed., 1995.
- "Guida all'espressione dell'incertezza di misura", ISO Guide, 1995.