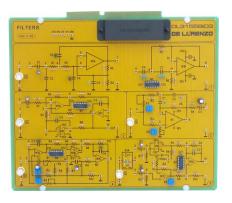# BIOMEDICAL ENGINEERING

FILTERS

DL 3155BIO3

In this course we will study the devices that allow the passage of biomedical signals with given characteristics, while attenuating those that do not comply with the required parameters.

This board does not substitute the medical device under study. The results of the experiments have no medical value. They are just for demonstration purposes.
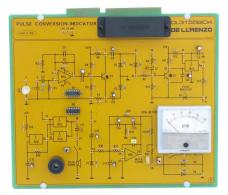
Theoretical topics:
- Filtering of the biomedical signals
- Types and characteristics of the filters
- Main configurations of the 1st and 2nd order filters
- Active LP, HP and KHN filters
- Filters applications in the biomedical instrumentation
- Notch filter
- Filters used in the measurement of the EEG and of the EMG

Circuit blocks:
- Low-Pass
- Band-Pass
- High-Pass
- Notch
- Band-Stop

PULSE CONVERSION

DL 3155BIO4

The events monitoring systems such as the frequency of the cardiac pulsations, the breathing frequency, etc., require that an analogue signal be converted to pulses and visualized on a display in order to be measured.
In this course students will study some circuits for analogue to pulse conversion, sound indicator and analogue frequency meter.

This board does not substitute the medical device under study. The results of the experiments have no medical value. They are just for demonstration purposes.

Theoretical topics:
- Role of the analogue-pulsed conversion
- Different types of pulse generators
- Description of a conversion block
- Role of the audio and visual signaling
- Description of a visual signalling block
- Description of an audio signaling block
- Different types of visual and audio indicators
- Role of the measurement of the frequency
- Instruments for the measurement of the frequency for biomedical applications
- Difference between analogue and digital meters

Circuit blocks:
- Circuit for the conversion of an analogue signal to a pulse signal
- Measurement of the frequency of a periodical signal
- Evaluation of the average cardiac frequency