

Program summary - Measurement and analysis of biosignals

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Development of advanced skills in signal analysis. Fourier analysis, linear systems, frequency response, information in the time and frequency domain. Time-frequency analysis, wavelets, filtering in time-, frequency- and time-frequency-domain.

Data acquisition and analysis techniques. Evoked response. Noise and interference. Nonlinear techniques, SNR maximization, artifact cancellation.

Elements of Bayesian statistics, inference, sensitivity and specificity of diagnostic tests, type I and II errors, ROC curves.

Mathematical models in physiology, the example of human hearing. Cochlear mechanics and generation of Otoacoustic emissions.

Fundamental physics elements at the basis of diagnostic techniques in Medical Physics, in particular, EKG, EEG, EMG, TAC e NMR.

Application of data analysis techniques and of theoretical models to clinical diagnostics, with special reference to the auditory function.