Summary
The goal of this course is to introduce the techniques most commonly used for the analysis of biomedical signals, and to present concrete examples of their application for diagnosis purposes.

Content
1. Generalities on biomedical signal processing
2. Digital signal processing - basics
   • sampling
   • Fourier transform
   • filtering
   • stochastic signals correlation, and power spectral density
3. Time-frequency analysis
   • short-term Fourier transform
   • time-frequency distributions, Cohen's class
   • wavelet transform
4. Linear modeling
   • autoregressive models
   • linear prediction
   • parametric spectral estimation
   • criteria for model selection
5. Adaptive filtering
   • adaptive prediction
   • adaptive estimation of transfer functions
   • adaptive interference cancellation
6. Miscellaneous
   • polynomial models
   • singular value decomposition
   • principal component analysis

Keywords
signal processing, biomedical engineering, signal modeling, spectral analysis, adaptive filtering

Learning Prerequisites

Recommended courses
Signal processing for telecommunications COM-303
Signal processing EE-350

Important concepts to start the course
basics of discrete-time signal analysis

Teaching methods
lectures, lab sessions using Matlab

Assessment methods
1 point for lab/exercise sessions reports
2 exams: end of November 2 points - final exam 3 points

Supervision
Office hours: Yes
Assistants: Yes