EEL 6504 ADAPTIVE SIGNAL PROCESSING
Fall 2015

Instructor: Jose Principe
Office: EB 451
Phone: 352-392-2662
Email   principe@cnel.ufl.edu
Office Hours: Tu 2th , Th 3th.

TextBook: *Adaptive Filter Theory, Simon Haykin, Prentice-Hall, 2002, ISBN 013-090126-1*

References:
      Adaptive Signal Processing, Bernie Widrow and Stearns, Prentice Hall,
      Fundamentals of Adaptive Filtering, Ali Sayed, Wiley, 2003
      Kernel Adaptive Filtering, Liu, Principe and Haykin, Wiley 2010

Course Goals:
The goal is to present the theory of adaptive signal processing and cover several engineering applications. The major topics will be the concept of adaptation, performance measures and the implementation of adaptive algorithms. Both the LMS and the RLS will be covered in detail. Adaptation of the signal bases will also be covered, such as eigendecomposions with on-line algorithms, and adaptation of generalized feedforward filters. Adaptive filtering in reproducing kernel Hilbert Spaces (RKHS).

Topics:

Adaptation as function approximation	Frequency domain LMS
Filters as Function approximators	Eigendecompositions
Wiener Filter Theory	Whitening transforms
Iterative algorithms	Adaptation in signal spaces:
Theory of adaptation:	Generalized Feedforward Filters
properties,	Lattice structures
search,	Adaptation in RKHS
measures	Theory
Adaptive algorithms	KLMS
LMS	KRLS
RLS	

Grading: Homework   25%
                      Project I   25%
                      Project II   25%
                      Exam   25%

Computer Projects:
Several application areas will be outlined. During the course students will have the opportunity to program adaptive algorithms in MATLAB and test them in real world data.