

CEEN8946-002: Special Topics in Fall 2007

Statistical Signal Processing for Wireless Communications

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Office hours: TF 2:00pm-4:30pm (other times by appointment)
Meeting time: TR 5:30pm-6:45pm
Classroom: PKI 161

Course Description:

This course presents a graduate-level overview of statistical signal processing and applications for wireless communications. It covers the characteristics of random signals, optimum linear filters, statistical parameter estimation using maximum likelihood (ML) and minimum mean-square error (MMSE) methods, adaptive signal processing using least-mean-square (LMS) and recursive least-square (RLS) approaches, Kalman filtering, and eigenanalysis algorithms. Applications of the statistical signal processing techniques in wireless communications will be explored.

- Required Texts:**
1. *Algorithms for Statistical Signal Processing*,
John G. Proakis, Charles M. Rader, Fuyun Ling, Chrysostomos L. Nikias,
Marc Moonen, and Ian K. Proudler
Prentice-Hall, Inc. 2002
ISBN: 0130622192
 2. *Statistical Digital Signal Processing and Modeling*,
Monson H. Hayes
John Wiley & Sons, Inc. 1996
ISBN: 0471594318

Recommended textbooks and supplementary materials will be posted on Blackboard.

Pre-requisites: CEEN-8246, CEEN-8800, and CEEN-8766

Topics to be covered but not limited to as follows:

1. Characterization of signals
2. Review of discrete-time random processes
3. Optimum linear filters
4. Least-squares methods
5. Adaptive filters
6. Recursive least-squares algorithms
7. Wiener filtering
8. Power spectrum estimation
9. Frequency components spectrum estimation
10. Eigenanalysis algorithms
11. Parametric methods for higher-order spectrum estimation

Course Landmark Schedule:

10/16/07	Midterm (open books and notes)
12/13/07	Term paper due
TBD	Final exam (take home)

Grading Weights:	Homework	20%
	Midterm	20%
	Term paper	30%
	Final exam	30%

Important notes:

Assignment:

Homework will be assigned weekly, which will be due at the beginning of class on the date indicated. For your own benefit, please attempt the problems before consulting your friends or instructor. The final write-up of the homework must be your own. Copying another student's homework is considered cheating and the appropriate action will be taken.

Midterm and exam:

Both the midterm and the final exam will be comprehensive, but open book and open notes. The exam topics will cover through the lecture one week before the exam date. Each exam will typically consist of five problems. You should work on it by yourself and no discussion will be allowed. The dates for these exams will be given and cannot be changed. Please schedule your planned trips or interviews so that they do not conflict with exam dates. But a waiver may be granted by the instructor in case of an emergency.

Regrades:

Regrade requests on any assignment must be submitted in writing within one week of the date when the material was returned to you. After this time, no further change in grade will be considered. When you return your paper for a regrade, please put date/time on the front sheet and indicate where and why you think that your assignment was graded incorrectly.

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The University of Nebraska-Lincoln (UNL) provides, upon request, appropriate academic adjustments for qualified students with disabilities. The UNL encourages all students to participate fully in the academic opportunities, cultural enrichment, and the wide array of social activities offered. Special attention has been given to remove physical barriers on campus and to provide support services to students with disabilities.

The UNL Services for Students with Disabilities (SSD) provides special assistance to students with disabilities through individualized help and counseling. Adjusting to college life and its academic demands is a new experience. SSD is committed to providing disabled students with the support that will enable them to confront challenges and reach their academic goals.

For more information concerning the following services SSD provides, please contact: [Veva Cheney](#), Director of UNL Services for Students with Disabilities