

EEL 6468 Smart Antennas

Credits: 3 credits

Textbook, title, author, and year: No textbook required

Reference materials:

The course is based on real-time developed classroom notes and there is no formally required textbook. The following texts can be considered as possible references:

"Detection, Estimation, and Modulation Theory, Part IV, Optimum Array Processing," Harry L. Van Trees, Wiley, ISBN 478-0-471-09390-4.

"Array Signal Processing, Concepts and Techniques," D. H. Johnson and D. E. Dudgeon, Prentice Hall, ISBN 0-13-048513-6.

"Smart Antennas for Wireless Communications," J. C. Liberti, Jr. and T. S. Rappaport, Prentice Hall, ISBN 0-13-719287-8

Specific course information

Catalog description:

This course covers the underlying principles and current state-of-the-art of smart antennas and array processing algorithms that can readily raise the signal-to-noise ratio of signals of interest, null-out or suppress interferers, identify active signals and their direction of arrival and track signal sources as they move in space. Topics covered include deterministic, mean-square optimal and adaptive beamforming; direction-of-arrival estimation; and joint space-time data processing

Prerequisites: Graduate Standing or permission from instructor

Specific goals for the course:

The main topics of interest are deterministic beamforming, mean-square optimum beamforming, adaptive beamforming and direction-of-arrival estimation. Applications are sought in the context of space-time processing for wireless communications with examples from code-division-multiple-access (CDMA) systems.

Brief list of topics to be covered:

Lectures on:

- Deterministic beamforming
- mean-square optimum beamforming
- midterm test
- adaptive beamforming
- direction-of-arrival estimation
- applications in space-time processing for wireless communications
- examples from code-division-multiple-access (CDMA) systems
- review (remaining available lectures)
- final test.