

EEE 558: Space-Time Coding (Fall 2008) (Instructor: Tolga M. Duman):

This is a three credit hour special topics course that covers multiple antenna communications techniques in wireless communications at a system level. The objective of the course is to provide a comprehensive introduction and overview of various coding/signaling techniques for multi-input multi-output (MIMO) communication systems. Specifically, list of topics to be covered are:

- Fading channels and diversity techniques
- Capacity of MIMO channels
- Space-time block codes
- Space-time trellis codes
- Layered space-time codes (spatial multiplexing)
- Concatenated coding for MIMO systems
- Unitary and differential space-time codes
- Space-time coding for frequency selective fading channels
- Practical issues (CSI estimation, channel correlation effects, etc)
- Antenna selection techniques for MIMO communications

Prerequisites: As a prerequisite, this course requires EEE 552 (Digital Communications) and naturally EEE 554 (Random Signal Theory). Although Wireless Communications knowledge would be beneficial, it is not required (necessary review will be provided within this course).

Textbook: We will use "Coding for MIMO Communication Systems" (by Duman and Ghayeb, publisher: Wiley, 2007) as the textbook. We will also refer to articles and other resources as necessary.

Course Requirements: The course will be run as a regular graduate level course with midterm, final, homework and projects. The specific details will be available in August 2008. If you are taking the course as "audit", then you will not be required to do the homework/projects, however it would be beneficial as learning tools to do them.