ELEC 433 Final Project

The goal of the final project is to implement a major component of a wireless system that has not been covered in class. For complex topics, it may be infeasible to implement a complete working system in the time allotted. However, you can implement a block critical for the topic. Please talk to us to narrow the scope of the project down.

There will be no class lectures during the project phase. In place of course lectures there will project progress updates from the teams on tuedays. Each group will present an update on their project every other week.

Possible Project Ideas:

Multiple antenna wireless (MIMO)

- Spacetime code: Alamouti
- Spatial multplexing: MMSE, Sphere
- Channel-inversion based Multiplexing
- Eigenvector based Multiplexing

Orthogonal Frequency Division Multiplexing (OFDM)

- Equalizer
- Channel estimator

Channel Encoder/Decoders

- Convolutional
- Turbo codes
- LDPC

Practical extensions of current design

- Higher-order modulations (requires coherent detection)
- Move from streaming to packet-based
    - Estimation-based CFO correction
    - Equalization via channel estimation
    - Correlation sequence for timing synchronization
- Channel coding(see above)

Deadlines and Grade Breakdown (see next page for more details):

- Project proposal (2%): 3/19
- Two project progress updates (13%): you choose among 03/26, 04/02, 04/09.
- Final Project report + presentation (25%): 2:00 PM, 05/01.

Project Proposal (due 3/19):
The project proposal should be a few paragraphs that define what you want to accomplish in your project. Be clear about (a) what you intend to implement, and (b) how you plan to validate and characterize the implementation. The proposal should show that you have done sufficient background research on your chosen project. Provide references if appropriate. The more specific you are in the proposal, the better off you will be, as it allows the instructors to give you guidance on what challenges you may be likely to encounter.

Two Project Updates:
You are required to present two project updates to the class and instructors. These should be 10-15 minute 5-10 slide presentations that communicate (a) the purpose and goals of your project, and (b) the progress accomplished to date. There are 3 Tuesday class sessions between the proposal (3/19) due date and the final report due date (4/19): 3/26, 4/02, 4/09. Pick two out of three of these dates to give your two project updates.

Final Report and Presentation
Final presentations will be given during the exam time allotted for this class: Wednesday, May 1, form 2:00 - 5:00 PM. Each presentation should 15-20 min, and include introduction to your project, a description of the design implemented, and the presentation of data that verify the design. Requirements for final report are defined in a separate document available on the website.