ECE 721: Introduction to Wireless Cooperative Communications and Applications

Spring 2014, March 7, 8 - 14,16, 2014

The course gives an introduction to wireless cooperative communication networks from the perspective of the channel and physical layer. It discusses cooperative networks protocols and application of these**.** It will deal with wireless channels and relay networks. Transparent and regenerative physical layer algorithms will be discussed to facilitate the analysis of different architectures. Use of distributed space time codes, multiplexing, orthogonal frequency division multiplexing will be analyzed to achieve multi-dimensional diversity (path, frequency and time), reduced interference and improved QoS.

Pre-requisites: Graduate standing, ECE 403 or consent of instructor

If you have problems registering, send me an email (atkin@iit.edu) with a list of communication courses that you have taken and your A#.

1. **COURSE TEXT:**

TBA plus collection of papers and notes provided by the instructor.

2. COURSE INSTRUCTOR:

Guillermo Atkin

Overview of wireless communications and systems

Review of digital communications

- Wireless systems from 1G to 4G-LTE
- Introduction to MIMO channels
- Introduction to space-time codes
- Introduction to network coding
- Multipath channel characteristics

Introduction to Transparent and Regenerative Relay Channels

- Propagation models
- Channel Models

Transparent relaying techniques (day 3 – 4)

- Transparent relaying protocols
  - Single and multi-branch hops
  - Transparent space-time processing
  - Distributed space-time codes
  - Distributed spatial multiplexing

Regenerative relaying techniques

- Regenerative relaying protocols
  - Decode and forward
  - Compress and forward
  - Distributed space-time coding
  - Distributed network-channel coding