# ECSE-6962 Fall '04

# **Mobile & Wireless Networks**

Mondays & Thursdays, 4:00-5:20 Low-3130

## **Professor Alhussein Abouzeid**

## **ABOUT THIS COURSE:**

The focus of this Course: Understand the fundamental, non-intuitive, aspects of the performance and design choices for emerging wireless networks, with a topical interest on mobile ad-hoc and sensor networks.

**Pre-requisites:** Mathematical maturity is expected, as is typical of any PhD student who passed a DQE exam with math or communications as major areas. Probability at the level of ECSE4500 is REQUIRED. Stochastic processes, information theory and optimization algorithms (e.g. linear programming) concepts preferred.

#### Not focus of this course (though these issues could be of importance):

- Detailed systems issues (e.g. how long a specific packet header is in a specific protocol implementation).
- Physical layer design (modulation and demodulation schemes, equalization, coding, etc.)
- Application layer development (e.g. Java, sockets, etc.)

#### Assignments and exams

# Insightful assignments and projects that combine homeworks, tests and projects in a manner that is not overbearing.

Two types of assignments:

- Mathematical in nature. For example, we will study in class certain mathematical models, and an assignment may introduce an alternative model or a small change in the studied model, then ask you to solve it. Mathematical maturity is expected.
- Some simulation based assignments. Note: this is not a course about coding, and the objective is not to test how good you are in writing code. However, programming literacy is expected.

<u>Antidote:</u> You may not have all the necessary background for all the material covered in this course. However, you should have the <u>minimal</u> background needed to learn the material. I'll give an example. Some of the papers we will study deals with algorithm complexity analysis. Others deal with stochastic processes. And finally, we may need to simulate some complex systems that we cannot model mathematically. Some of the material should be trivially easy for you, and a few others being totally new concepts. At the end, you will hopefully learn and appreciate the variety of tools and techniques and how they are applied to solve some of the challenging problems in this field.

## **Course Dynamics/Format:**

There is no textbook. We will learn things from some text-books as they become needed. We will focus on recent (2001-2003) papers from conferences (MobiCom, MobiHoc, Infocom) and journals (Trans. on Networking, Wireless Networks, etc.).

We will cover approximately 20 papers (around 1 paper a week). The syllabus can be classified to three parts; Medium Access Control, Routing and Transport. The background to understand the details of each paper will be mentioned in class, sometimes I will give a short overview for advanced techniques.

There will be a simulation or mathematical assignment (or both) every approximately two weeks, a mid-term and an in-class final exam.

# The Big Picture

Infrastructure-less networks (also called peer-to-peer, ad-hoc, impromptu, etc): Are the focus of this course. Infrastructure networks will be partially covered.