CS 528: Mobile Computing and Networking

Coordinates: T Th 4:25-5:50pm
Instructor: Dr. Nael Abu-Ghazaleh
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Office Hrs: 10:30–12:00 MW or by appointment
TA: Mr. Mahesh Kumar, mkumar@cs.binghamton.edu
Office Hours: TBA

Reading Material: We will rely almost exclusively on research and review papers and RFCs. You are strongly encouraged to do reading outside of the assigned text/lecture material. There are very few good books on Mobile computing, including:

- Mobile Computing
- Wireless Communication, Stallings 2001
- Ad Hoc Networks, Charles Perkins (Ed.), 2001

Description: The course provides an introduction to mobile computing and networking. It will also cover the open research problems and challenges in the field. Topics covered include: Network architecture and design (cellular, multi-hop, ad hoc, sensor networks). Wireless channels, channel allocation and medium access protocols. Supporting mobility in the Internet. Network protocols: routing and addressing issues and approaches; transport protocols for wireless environments. Power aware computing and networking. Quality of Service issues. Security. Wireless applications (location aware applications, wireless multimedia, differentiated services). Smart environments.

Outline: There is not set in stone by any stretch. But a tentative set of topics that I would like us to cover:

- Introduction and Motivation
- Wireless Propagation and Link Layer Issues
- Cellular Networks
  - Infrastructure and Technologies
  - Supporting Mobility
  - Transport Protocols
- Ad Hoc Networks
  - Medium Access Protocols
  - Routing Protocols
  - Optimizations and Other Issues (Multicast)
- Sensor Networks
- Power Aware Protocols
- Mobile Computing
  - Caching Issues
  - Location/Context Aware Computing
- Ubiquitous Computing/Augmented Reality
- Wireless Security
- Technologies (Bluetooth, 802.11b, WAP...)
Format/Policies:

- Every week we will consider one topic (sometimes two related ones).
  - In a week we will cover a few papers related to the topic we will discuss
    - typically 2–4 papers. The idea is to give different points of view and
      be able to contrast different approaches.
  - Everyone will have to read the core assigned papers. In addition, there
    will be additional papers that students will present. I hope that everyone
    will get the chance to present a paper in the course of the semester.
  - Usually, I will present a summary of the topic we are going to discuss (to
    basic background to the papers you will read), then we will discuss the
    assigned papers in detail.

- You will write critiques for the papers we read. A critique is a summary of
  the key ideas of the paper, and your evaluation/discussion of them. Everyone
  must maintain a journal (A booklet/folder) where you keep your critiques.
  The notes should summarize the paper and present your technical evaluation/critique of it. Please bring the journals to class; they will be collected
  periodically and graded.

- There will be a single substantial group project. I will provide you with a list
  of suggested topics. Within 6 weeks of the start of the semester, I would like
  a project proposal from the list I provided or on your own (feel free to discuss
  ideas for a project with me). The group size should be no larger than 3. The
  project should design and conduct a study, or propose and prototype a new
  idea (protocol, optimization, etc...). The best of these studies should be at a
  level publishable in a refereed conference. You will have 20 minutes to present
  your project in the last class in the semester.

- Tentatively, there will be no homeworks or midterms. This is subject to
  change if I feel that the reading assignments and class discussions are not at
  the level to be expected from a research class.

- The class homepage is at http://www.cs.binghamton.edu/~nael/cs527.
  This page will also have class related announcements and links to the reading
  list, class notes if any, and minutes of the class as provided by each lectures
  scribe(s).