New EE599 special topics course for Spring 2003

Wireless Sensor Networks
3 Units
Instructor: Bhaskar Krishnamachari

Introduction:

Wireless sensor networks are unattended distributed systems consisting of large numbers of inexpensive devices – each capable of a combination of sensing, communication and computation. These networks are expected to be deployed in high densities in order to obtain detailed information about the operational environment. Applications range from environmental monitoring and seismic studies to mobile target tracking. Sensor networks provide a fundamentally new set of research challenges – involving the development of self-configuration protocols that are energy-efficient, fault-tolerant and scalable. This is a relatively new research area with many open problems of cross-disciplinary interest. The course will provide the students with a comprehensive introduction to this area through readings of recent papers, talks by guest speakers, and group projects.

This course will also train the students in the craft of academic research. Substantial emphasis will be placed on teaching the students how to read research papers in a critical and analytical manner. Each student will present one paper to the class, and will be given individual feedback on his/her talk. The student group projects will be monitored and guided on a weekly basis through out-of-class meetings and emails. Finally, their expository writing skills will also be developed through constructive feedback on their weekly critiques, the mid-term and final reports.

Enrollment & Prerequisites:

Prerequisites: EE450, EE465, prior approval of instructor.

The size of the class will be about 18-24 students. Acceptance into the course will be based on an application form, and prior approval of instructor (possibly after a one-on-one meeting).

Students who enroll in this course must have a solid mathematical background as well as excellent programming skills (C/C++/Java). The course is meant for students with motivation and interest in research. Advanced coursework in EE or CS (not necessarily networks-related), prior directed research experience or Ph.D. standing will be considered a plus.

Grading Policy:

The students’ performance will be evaluated as follows: paper critiques 30%, paper presentation 15%, mid-term report 5%, final project report 25%, and final project presentation 25%. 
Course Outline and Syllabus:

Weeks 1 & 2:
Introduction to Wireless Sensor Networks, Strategies and Techniques
for Graduate-level Research

Weeks 3-11:
Selected Readings (3-4 papers per week, presented by individual students) AND
Guest Speakers (1 or 2 every two/three weeks from industry and academia)

Reading Areas:
- Routing & Information Dissemination
- Critical Phenomena & Self-configuration
- Fault-tolerance and Robustness
- Energy Efficiency
- Sensor Networks as Distributed Databases
- Habitat Monitoring, Target Tracking, and other Sensor Applications

Weeks 12-15: Student Project Presentations

Assignments:

Students will be asked to write 1-page critiques of each paper read in the class. The critiques will identify the thesis of the paper, discuss the assumptions, methodology and conclusions, and propose ways in which to extend/improve upon the work. Each student will be responsible for presenting and leading the discussion on one paper during the semester.

Projects:

Will be done by students in groups of 3. The topics will be chosen either by the students themselves independently or from a list of possibilities provided by the instructor. The students will provide weekly progress notes and a mid-term report, in addition to a final presentation and report.