CSC 7701 Sensor Networks Spring 2010

Time: Thursdays, 5:00-8:00 PM

Place: 0111 Coates

Office Hours: T-Th 3-5 PM and by appointment (send email)

An important class of distributed networks are those that support monitoring and manipulation of physical spaces through wireless sensor networks. This course will study the distributed protocols needed to realize these systems. The emphasis is on conceptual and experimental issues in the design and implementation of wireless sensor networks. This material will be taught primarily by reading and discussing the relevant papers in the area, augmented with homework and programming assignments and optional readings from textbooks.

Topics include: a) design implications of energy, and otherwise resource-constrained nodes; b) network self-configuration and adaptation; c) services such as routing, localization and time synchronization; d) collaborative processing and distributed feature extraction, e) tasking and programming sensor networks.

Prerequisites: CSC 4103/7103 (Knowledge of Operating Systems),
Knowledge of systems programming (C, C++, JAVA), graduate standing or consent of instructor.

Course Structure:

20 % Class attendance (those given by the instructor as well as those given by other students) and participation (paper presentation).

30% Programming Project: Several (group) systems programming projects dealing with experimental design and implementation of some aspect of sensornet implementation. Projects will be done in small groups of 3-4 people using the resources in the networking lab (Coates 175).

30% Homework: Paper review (summary) of two papers from each section of the reading list. Submit an original quantitative (i.e. with numbers) question and solution associated with one or more of the papers from each section.

20% Term Paper: A final end of term research paper dealing with some hitherto unsolved or unsatisfactorily solved problem in sensor networks.

Topics: (Reading List to be handed out next class)

Introduction to the Sensor Networking concept, Applications

Software Platforms/Simulation Tools

Sensor Deployment

MAC (Link) Layer Protocols

Synchronization and Localization

Data-centric Storage, Querying, and Routing

Topology Control and Energy Awareness

Reliable Transport

Network Capacity and Lifetime

Target Tracking with Sensor Networks

Security & Integrity