

# CSE 430: Research Topics in Computer Networks

## --- Sensor Networks and Embedded Systems

### Course Information

Time and location: M/W 11:00am – 12:15pm, ITEB 125

Instructor: Jun-Hong Cui ([jcui@cse.uconn.edu](mailto:jcui@cse.uconn.edu))  
Office: ITEB 267  
Phone: (860) 486-8951

Instructor office hours: Monday 2:00pm – 4:00pm or by appointment

Class online: Check WebCT Vista (<http://webct.uconn.edu>)

### Course Description

This course will include two parts: terrestrial sensor networks and underwater sensor networks, focusing on the networking and systems aspects. State-of-the-art techniques in terrestrial sensor networks will be reviewed, and the unique characteristics of underwater sensor networks will be introduced. Through this course, students will be well educated in sensor networks and embedded systems (both terrestrial and underwater). It will help graduate students understand the design challenges, current approaches and possible future directions on sensor networks and embedded systems. It aims to introduce graduate students to research, and exploit potential areas for MS comprehensive projects or PhD research directions. This course is intended for graduate students at **ALL** levels.

This course has a research seminar style. It consists of the instructor's overview lectures, invited external talks, and students' presentations. Each student is expected to read research papers and give presentations. In-class discussions and peer-critiques are especially encouraged. Along the course, there are term projects. Students can form groups in **2** persons and choose projects, which can be of a taste of implementation, simulation, measurement, or even literature survey.

### Course Prerequisites

- CSE245, or CSE330, or equivalent with permission of the instructor.

### List of Topics (Tentative)

- Overview of Sensor Networks and Embedded Systems

- Part I: Terrestrial Sensor Networks
  - Applications
  - Wireless Communication Basics
  - MAC, Routing, Reliable transfer
  - Synchronization, Localization, Security
  - Power Management and Harvesting
  - Data Storage and Query Processing
- Part II: Underwater Sensor Networks
  - Applications
  - Communication Challenges
  - Networking Challenges
  - System Challenges

## Recommended Readings

Most of the reading for this course will be papers from the Reading List (to be posted in WebCT). Some reference books that might be of interest are:

- Principles of Embedded Networked Systems Design, Gregory Pottie, William Kaiser, Hardcover (ISBN-10: 0521840120, ISBN-13: 978-0521840125), Cambridge University Press, October 31, 2005
- Wireless Sensor Networks: An Information Processing Approach, Feng Zhao and Leonidas Guibas, Hardcover (ISBN-10: 1558609148, ISBN-13: 978-1558609143) Morgan Kaufmann, July 6, 2004

## Grading

There will be 10 required paper reviews, two class presentations, and one term project. There will be **NO** exams.

The final course grade will be computed as follows:

- Class participation: **10%**
- Class presentation: **20%**
- Paper reviews: **20%**
- Term project: **50%** (5% proposal, 10% progress report, 15% presentation, and 20% final report)

## Paper Reviews

The objective of paper reviews is to help the graduate students develop some basic networking research skills and explore some interesting research topics in networking. We will have 10 paper reviews. Before each class, a graduate student should read the required paper and prepare a one to two-page long written critique for the paper. Requirements and submission instructions will be posted separately.

## **Late Policy**

Paper reviews and term projects must be turned in before the specified due date and time. Late paper reviews and projects will **NOT** be accepted.

## **Academic Integrity**

We will follow the [University Policy on Academic Integrity](#) regarding any cheating and plagiarism. Take the time to familiarize yourself with the contents of this page, as you are responsible for its contents.