Course Information

In this class, students are expected to understand the fundamentals and research trends of wireless networks and protocols. To achieve these goals, we will address topics including but not limited to, radio propagation, multiple radio access, cellular networks, mobile communication system, ad hoc networks, vehicular networks, sensor networks, and wireless local area networks. The instructor will present a list of recently published research papers in this class. Students are required to participate in the discussions of these papers. Students are also expected to conduct a research project, generating two (2) written reports and giving two (2) in-class presentations. Students will be expected to collaborate with other students toward the completion of the research project related to wireless networks and protocols. The results from projects will be written in technical reports according to the IEEE Transactions format. Based on the novelty and technical contribution of each report, the instructors will suggest an appropriate conference or journal to students to submit their works.

Prerequisites

CSCE 3600

Course Objectives

Students who have completed this course should be capable of doing the following:

- Understand the basic operation of a cellular network
- Understand the basic operation of different network elements of cellular network
- Understand the soft and hard handoff
- Understand the function of interfaces between BTS, BSC, MSC and PSTN
- Understand the basic issues related to support QoS in voice and data services in cellular networks
- Understand the basic operation of 4G networks and interworking of wireless and wireline networks
- Understand the fundamentals of different wireless networks and protocols
- Improve technical writing and oral presentation skills

Textbook


Reading List

Selected research papers on wireless network and protocols


The instructor will present the above listed papers, and students are strongly encouraged to read these papers before they come to the classes.

**Topics**

- Introduction to wireless networks
- Radio propagation
- Cellular concept
- Multiple radio access
- Mobile communication system
- Ad hoc network
- Vehicular network
- Sensor network
- Wireless LAN

**Assessment**

**Exams**
There will be THREE exams and NO final exam in this class. Exams will be closed book, closed notes. Questions will be derived from lectures, assignments, and papers discussed in classes.

**Homework**
There will be THREE homework assignments and these activities will be take-home in nature and designed to reinforce concepts taught in class. Solutions to homework assignments must be submitted on blackboard by 11:55 PM on the due dates.

**Project**
Students will be divided into groups and each group will conduct a research project related to wireless networks and protocols. Students need to start looking for potential research problems from the third week or even earlier. Students need to discuss with the instructor about their choices. Each group will write a short proposal (>= 3 pages) describing their intended research work. Each group is required to present their proposal in the class to collect comments and feedbacks from others. The research proposal should be submitted on blackboard by **Oct 6, 2017**. The proposal should include a brief literature review about the topic chosen, a clear statement of the problem to be solved, and a description of proposed solution. The proposal will be extended to a final report (>= 6 pages) with details about the solution, experiment setup, experimental data, result analysis, discussions and conclusions. Each group is required to present their final report in the class to collect comments and feedbacks from the instructor and other students. Final report should be submitted on blackboard by **Dec 8, 2017**. Proposal and final report should be prepared by LATEX according to the IEEE Transaction format (2-column).

**Attendance**
Class attendance is mandatory. This is a graduate/undergraduate class, so students need to actively participate in class. It is believed that if you miss many classes (more than 6), there is a strong
likelihood that you will not pass the class. Please notify me in advance if you are attending conferences, research meetings, or something alike.

**Grading**

- Exams (35%)
  - Exam1
  - Exam2
  - Exam3
- Homework (25%)
  - Home1
  - Home2
  - Home3
- Project (40%)
  - Proposal (20%)
  - Final Report (20%)

**Due Dates**

The due dates of homework assignments and project reports can be found from the calendar on blackboard. The deadlines for all assignments are always 11:55 PM on the due dates. Late assignments will receive a grade of zero (0). Deadlines will be made as generous as possible to a priori take into account illness, other courses, and nearly all conceivable excuses. If you have a documented illness preventing you from completing your assignments, you may submit all of your partial work and request an extension by sending email to Dr. Qing Yang. Extension is not automatic.

**Special Accommodations**

A student in need of special accommodations must bring that need to my attention within the first two weeks of class. The need must be properly documented.