Wireless Networks

General Course Info

Term: TERM 2015
Department: COMP
Course Number: 635
Section Number: 088

Time: TR, 11:00 am – 12:15 pm
Location: FB 007
Website: http://wireless.web.unc.edu

Instructor Info

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Office Hours: By appointment (send email)

Textbooks and Resources

The slides and handouts will be available on the course web-page (wireless.web.unc.edu). The papers to be used for paper presentations and critical reviews will also be linked off the course web-page. The following references provide good information for the core background material:

- Jochen Schiller, “Mobile Communications”, Pearson Education.
- William Stallings, “Wireless Communications & Networks”.

Course Description

This course builds an understanding of the core issues encountered in the design of wireless (vs wired) networks. It also exposes students to fairly recent paradigms in wireless communication.

Target Audience

This course is intended as an advanced undergraduate course as well as a graduate course. The prerequisite is an undergraduate course in Computer Networks. It is meant for students who want to build background knowledge in the area of wireless and mobile communications.
Prerequisites

COMP 431

Goals and Key Learning Objectives

At the completion of this course, students are expected to understand and apply knowledge of the key issues that differentiate wireless and wired communication. The students will also be well-versed with selected recent paradigm-shifting concepts being developed in the research community. Through hands-on projects, the students are expected to familiarize themselves with wireless technologies.

Course Requirements

The students will:

• Write critical reviews for (selected) papers presented in class in the latter part of the course. Students do not need to submit reviews for papers they are presenting themselves. Students can also skip up to two other presentations.
• The students will also take turns in presenting the papers in class.
• The students will also pursue semester-long projects, and will prepare and present at associated milestones (proposal, mid-project progress, and final presentation). A final report is also due at the end of the semester.

Key Dates

The end-term oral exam will be held after the last class, during the exam week. The exam will be oral, and will be in the form of a 1-on-1 session between each student and the instructor.

Grading Criteria

The final grades will be assigned according to the following components (all percentage points below are flexible by 5-10%):

• Paper Presentations: 25%
• Critical Reviews: 20%
• Projects:
  o Progress: 30%
  o Presentation + report: 10%
• Final Exam (likely, oral): 15%

Class participation will be used to potentially bump up (or down) half a grade.
Course Policies

Attendance is expected in all class meetings (if you have an emergency, please notify the instructor). Critical reviews will not be accepted after a paper has been discussed in the class. Exceptions may be made to these, but only under rare circumstances.

Honor Code

Students are allowed to collaborate on their projects, paper presentations, as well as critical reviews. However, all collaboration must be in terms of ideas/approach – the final reports and written reviews must be prepared solely by students on their own.

Course Schedule

Background Core Topics:
• History of different types of wireless technologies
  o Cellular systems, satellite systems, broadcast systems, wireless LANs
• Physical characteristics of wireless transmission (including signals, antennas, multiplexing, modulation, interference)
• Medium Access Control
  o Coordinated access (TDMA-based, CDMA-based, …)
  o Random access (802.11)
• Mobile network layer issues
  o Mobile IP
  o Ad-hoc Routing
• Transport layer issues in mobile networks
  o Wireless TCP

Additional topics are covered from recent publications.

Disclaimer

“The professor reserves the right to make changes to the syllabus, including project due dates and test dates, as well as the percentage points assigned to grading categories. These changes will be announced as early as possible.”