

# COMP/ELEC 524: Mobile and Wireless Networking Course Syllabus

## Instructor

Dave Johnson, [dbj@cs.rice.edu](mailto:dbj@cs.rice.edu), Duncan Hall 3007, x3063. Office hours: TBA.

## Teaching Assistant

TBA

## Class Meetings

MWF 1:00–1:50 pm. Location: DH 1075

## Course Description

Mobile computing devices such as laptop computers and PDAs are widely available at very affordable prices, and many new wireless networking products and services are available based on technologies such as spread-spectrum radio, infrared, cellular, and satellite. Mobile computers today often are as capable as many home or office desktop computers and workstations, featuring powerful CPUs, large main memories, many gigabytes of disk space, multimedia sound capabilities, and large color displays. High-speed local area wireless networks are commonly available with speeds up to 54 megabits per second, and wide-area wireless networks are available that provide nearly nationwide service.

However, wireless networks have fundamentally different properties than typical wired networks, including higher error rates, lower bandwidths, nonuniform transmission characteristics, increased usage costs, increased susceptibility to interference and eavesdropping, and higher variability of performance. Similarly, mobile nodes behave differently and have fundamentally different limitations than stationary nodes. For example, mobile nodes generally operate on limited battery power and may move and change their point of connection to the network.

This course will examine the area of mobile and wireless networking, looking at the unique network protocol challenges and opportunities presented by wireless communication and host or router mobility. Although we will touch on some of the important physical layer properties of radio and infrared communications, our focus will be on network protocols above the physical layer, with an emphasis on the media access control, network, and transport protocol layers. Examples of topics that will be covered in the class include:

- Multiple access protocols, including MACA, MACAW, and IEEE 802.11
- Routing techniques for mobile nodes in the Internet, including Mobile IP for IPv4 and IPv6
- Routing techniques in multihop wireless ad hoc networks
- Authentication and security needs and techniques used in different mobile and wireless networking systems

- Effects of mobility and wireless transmissions on reliable transport protocols such as TCP

If you have suggestions for mobile or wireless networking topics you'd like to see covered in the course, please let me know.

## Course Format

The course is structured around recent research publications in mobile and wireless networking. The course involves intensive reading of research papers. I expect you to have read the papers in advance of the class discussion on them. Open, free, and *informed* class discussion will be essential to the understanding of this course.

There is no textbook for this course. Copies of the papers to be read for each class meeting will be handed out in class. You should *read the papers* before the class period in which they are covered in class.

## Assignments

In addition to *reading the papers* and attending and participating in class, there will be a midterm exam, a final exam, and a course project.

You can use any computers you have access to for the course project. I also plan to make accounts available on one or more machines in my lab, which you can access remotely.

The course project will be handed out in a few weeks. Depending on course enrollment, the project will be done groups of 2–3 students, and will involve design and evaluation of some protocol, typically through simulation in the *ns-2* simulator. You can pick your own topic for the project. The project will begin with a project proposal that I must approve. A final report for the project will be due at the end of the semester.

## Course Web Page

The Web page for this course is located at

<http://www.monarch.cs.rice.edu/comp524/>

Here you will find an evolving copy of the course schedule and any important announcements relevant to the course, as well as a copy of this course syllabus and other information. You should check the course schedule and announcements often.

## Grading

Your final grade for the course will be computed based on the following tentative weights for the individual assignments:

10%	Class participation
30%	Course project
30%	Midterm exam
30%	Final exam

## **Prerequisites**

You should generally have had some type of previous networking course such as COMP/ELEC 429. Having completed a previous course in operating systems may also be to your advantage but is not required.

## **Honor Code Policy**

All assignments in the course are conducted under the Rice Honor Code.

The midterm exam and final exam, of course, must be your own work. During each exam, you may refer to any of the papers or copies of slides handed out in class and to your *own* notes from any source made before you start the exam.

For the course project, your project group is expected to do its own work, and you must cite any sources that you use in your project.

## **Students with Disabilities**

Any student with a disability requiring accommodations in this course is encouraged to contact me after class or during office hours. Additionally, students should contact Disability Support Services in the Ley Student Center.