CS603  Mobile Computing, Communications and Systems

Fall 2004 Semester

Instructor: Professor Ajay Gupta  Time & Place: T R 11:00-12:15, C0141 CEAS
Call Number: 48637, 3 credit hours  Prerequisites: CS555 and see below

This course is a 3 credit hour graduate level advanced topics course, intended for students who plan to pursue research, design and development concerning the exciting and emerging area of mobile and pervasive computing. The need for “information anywhere anytime” has been a driving force for the ever increasing growth in Web and Internet technology, wireless communication, and portable computing devices. The field of mobile computing is the merger of these advances in computing and communication with the aim of providing seamless and ubiquitous computing environment for mobile users.

The goal of the course is to provide an in-depth understanding of the fundamental problems in the area of mobile computing and present the existing and proposed solutions for these problems from both development and research perspectives. This class will also focus on the nature of computation and communication needed to design large-scale distributed mobile computing systems. We will study emerging wireless and mobile devices technology and standards on topics ranging from network protocols to support mobility, efficient and adaptive resource management techniques for wireless bandwidth and battery power, predicting mobility patterns, data management techniques, performance modeling and simulation of mobile applications, and supporting mobile real-time multimedia applications. Emerging computing models including mobile client/server, wireless thin client, proxy architectures, disconnected operation, proximity computing, peer to peer, and application- and system-aware adaptation will be given an in-depth treatment. This semester’s focus will be on systems and applications development.

This course requires active and serious student participation in a semester-long group project. Groups of no more than two-three students will be responsible for one or more aspects of the design and development of a mobile computing system. The group project is intended to complement the reading material by allowing the students to develop experimental skills for network and real-time system programming, and network application simulations. Each group will have an opportunity to present its work to the class and to the department.

Topics Covered (tentative):

- Intro to Distributed Computing
- Intro to Computer Networking
- Intro to J2ME, OPNET, NS2
- Intro to Mobile Computing
- Mobile Networking
- Wireless Local Connectivity
- Mobile Computing Models
- Pervasive Computing
- Mobile Data Access and Mobile Transactions

Course Prerequisites:

- Strong desire, self-motivation & dedication to learn & contribute to the emerging area of mobile computing.
- Proficient in C, C++ and Java (especially network programming)
- Low-level, systems programming and Linux programming experience
- Some mathematics and statistics background

For more information, contact Dr. Ajay Gupta at ajay.gupta@wmich.edu or 276-3104.