

**Instructor :** Kihong Park

**Class :** MWF 10:30–11:20am (LWSN B134)

**Office Hours :** MW 1:30-3pm and by appointment (LWSN 1211)

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**Course Content :** Seminar course that covers principles, advances, and challenges of next generation wireless networks.

**Prerequisites :** A graduate or undergraduate course in computer networks.

**Text Books :** Course material including lectures notes will be made available on-line. Reference books and manuals will be available at the Network Systems Lab.

**Work Load and Grading Policy :** This being a seminar course, there are no midterm or final exams. At the mid-point of the semester, a course project—group or individual—will be proposed, discussed, and carried out. The results are submitted in a project report and presented at the end of the semester.

**Lab Space :** For students wishing to do a systems implementation project, wireless equipment in the Networks Systems Lab (HAAS G50) will be made available.

### **Overview of the Course :**

The aim of the seminar course is to acquire the knowledge and technical skills for understanding and tackling next generation wireless networks. Unlike wired networks which have, to a large extent, been commoditized, wireless networks are still in a state of flux. Next generation wireless networks cover three spatial scales: One, very short distances—sometimes called personal area networks—which are aimed at eliminating wires for multimedia devices including HD/3D TVs. Two, local area distances aimed at providing shared access to wired/wireless switches connecting to ISPs. Three, wide area distances whose goal is to provide high-bandwidth integrated data/cellular service. For the first two types, providing high throughput is the central goal. Eliminating pesky HD/3D TV wires requires bandwidths in the hundreds of Mbps. As the recent debacle with iPhone 4 antenna obstruction indicates, wireless communication is a different beast from wired communication. Understanding what makes wireless networks different from their wired brethren is essential for building systems that work as planned. High-speed wireless LANs are designed to provide nominal bandwidths in the several hundred Mbps range, but the effective throughput they can achieve is another matter. Bridging the speed mismatch between wired and wireless networks is a key challenge to providing high-speed ubiquitous access. Wide area wireless networks such as WiMax and WiBro have been in deployment testing and limited commercial operation for a number of years. Their future, however, remains uncertain due to performance and integration concerns. In the seminar course, we will discuss the principles and practice of legacy wireless networks, their bottlenecks and limitations, and explore new ways to overcome them.