EN4382 Wireless & Mobile Communications

Course Information

Learning Outcomes: At the end of the module the student will be able to:

1. explain relative merits and demerits of wireless communication technologies.
2. select a wireless technology or a combination of technologies to suit a given application.
3. plan a wireless communications system for a given environment in which it is to be deployed.

Pre-requisites: EN3052 Communications II, EN4052 Communications III

Lectures
PG Seminar Room - Thursday 8.15 PM - 10.15 PM

Tutorial/Group Study Sessions (GSSs)
The tutorial/GSSs schedule will be announced later (approx. one session per two weeks).

Course Lecturers

1. Dr. Chandika B. Wavegedara
   Office Hours: Thursday 2.00 p.m.-4.00 p.m. or by email appointment

2. Ms. Samiru Gayan
   Office Hours:
Course Syllabus

1. **Introduction: (1 hrs)**
Introduction to wireless communications: history and evolution, current wireless communication systems, requirements of wireless services, and technical challenges of wireless communications

2. **Propagation and System Planning: (6 hrs)**
Radio wave propagation in the mobile environment: Free-space propagation, propagation mechanisms, large scale and small scale fading, path loss models, statistical channel models: narrowband and wideband models, System Planning: mobile radio link design, and introduction to radio network planning.

3. **Wireless Access: (6 hrs)**
Overview of wireless access networks: base and subscriber stations, multiple access technologies, noise and interference in wireless communication systems, diversity reception, MIMO communication: MIMO narrowband channel model, transmit diversity and spatial multiplexing

4. **Cellular Systems: (7 hrs)**
Evolution of cellular systems, principles and operation of cellular systems, narrowband systems: FDMA and TDMA systems, frequency planing, and capacity considerations, CDMA wideband systems: resource allocation, soft handover, power control, interference and capacity, OFDMA wideband systems, and Standardized cellular communications systems

5. **Wireless Network Standards: (4 hrs)**
Wireless LANs, wireless MANs, short range wireless networks, standards, capabilities and applications, broadband wireless networks, and integration of different types of wireless networks

Introduction to sensor networks and applications, issues in sensor networks in comparison to conventional wireless networks, special design considerations in energy conservation, routing etc.

Course Texts


Additional Readings

3. Articles in *IEEE Communication Magazine* and *IEEE Wireless Communication Magazine*

Course Requirements and Grading Policy

- Take-home Assignments - 5%
- In-Class Quizzes - 5%
- Lab Classes/Group Learning Assignments - 12%
- Student Seminar - 8%
- Final Exam (2 hour) - 70%