

MScIT53 – Wireless Communications and Networks

Instructor: Dr. Yufei Wu

Class Schedule: Tuesday and Thursday. 2:00 – 4:00 p.m.

Location: Seminar Room 6

Lab time/location: TBD

Office Hours: 10:00 a.m.–6:00 p.m. or by appointment

E-mail: EMAIL (caribbean@inbox.com)

Course URL: www.u.tt/ict

Course Description

The focus of this course is the physical layer, data link layer, and network layer associated with wireless communications and networks. At the physical layer, the emphasis is on radio channel characterization, modulation, equalization and diversity. At the link layer, the emphasis is on how the spectrum is shared, either in time (TDMA), frequency (FDMA), code (CDMA), area, or angular direction (SDMA). Related issues such as power control, handover, and admission control will be addressed. At the network layer, the emphasis is on cellular network planning and optimization aspects.

Prerequisite: Signal Analysis, Probability Theory, Analog and Digital Communications.

Assessment

Assignments 20 %

Project 20 %

Midterm Exam 20 %

Final Exam 40 %

Reference Material,

- Wireless Communications: Principles and Practice, 2nd edition, Theodore S. Rappaport
- Wireless Communications, Andreas Molisch
- Modern Wireless Communications: Simon Haykin and Michael Moher
- Wireless Communications and Networking: Jon W. Mark and Weihua Zhuang

Course Schedule

Date	Topics
Week 1 (January 12 – 16)	Physical Layer: Large scale path loss (free space model, ground reflection two ray model, some probability theory)
Week 2 (January 19 – 23)	Physical Layer: Large scale path loss (lognormal shadowing, coverage area determination, statistical communications theory)
Week 3 (January 26 – 30)	Physical Layer: Small scale fading (Rayleigh fading, Doppler, Fast fading, frequency selective fading, coherence bandwidth)
Week 4 (February 2 – 6)	Physical Layer: Modulation (AM, FM, PM, BPSK, QPSK, QAM)
Week 5 (February 9 – 13)	Physical Layer: Equalization and diversity
Week 6 (February 16 – 20)	Physical Layer: Source coding and channel coding
Week 7 (February 23 – 27)	Network Layer: (Cellular system design)
Week 8 (March 2 – 6)	Data Link Layer: Radio resource management (call admission control, handoff management, power control)
Week 9 (March 9 – 13)	Data link Layer: Mobility management (location management, traffic engineering, packet access)
Week 10 (March 16 – 20)	Physical Layer: Physical layer performance (coverage, capacity, high bit rate, performance enhancement)
Week 11 (March 23 – 27)	Network Layer: Wireless/Wireline internetworking
Week 12 (March 30 – April 3)	Hot topics in wireless research