ECE547
Wireless Networks Performance Analysis

Yu Cheng
Illinois Institute of Technology
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ILLINOIS INSTITUTE OF TECHNOLOGY

Course Framework

Instructor

- Prof. Yu Cheng, Dept of ECE
- cheng@iit.edu; (312) 567-7996; Siegel Hall 320
- Office Hours: Tuesday/Thursday, 3:00-4:00pm; and by appointment

Course Description

- This course deals with the performance analysis techniques for the main types of wireless networks used today, including cellular communication networks, wireless local area networks (WLAN), ZigBee wireless networks, and wireless mesh networks. The course not only discusses the details of the related IEEE standards, but also focuses on mathematical modeling and analysis to compute the quality of service metrics as well as resource utilization efficiency. Key topics include cellular system design, mobility management, conflict-free medium access, contention-based medium access, Markov chain modeling for 802.11, fixed-point based analysis, 802.15.4 modeling and analysis, and wireless mesh network capacity analysis.

Pre-Requisites

- Basic Probability Theory, Computer Networks

Text Book

(1) Jon W. Mark and Weihua Zhuang, *Wireless Communications and Networking*, Prentice Hall, 2003. ISBN 0-13-040905-7

(2) Lecture notes provided by instructor

Tentative Course Outline

Week 1:	Overview
Week 2:	Overview of Probability and Markov Chain
Week 3:	Cellular Communication Networks
Week 4:	Mobility Management
Week 5:	Wireless/Wireline Interworking
Week 6/7:	Multiple Medium Access Control
Week 8:	Midterm Examination
Week 9:	Markov Chain Modeling for 802.11
Week 10:	Fixed-point analysis for 802.11
Week 11:	Fixed-point analysis for 802.15.4
Week 12:	Multi-hop Wireless Mesh Networks
Week 13:	Multi-Radio Multi-Channel Wireless Networks

Final Examination

Assignment and Grading

Homework assignments

- Submit to TA before the specified deadline
  - NO LATE Assignments accepted without prior instructor consent
- TA: To be announced
  - Office hours: to be announced

Grading system

Homework Assignments	10%
Course Project	15%
Midterm Exam	35%
Final Exam (Comprehensive)	40%

How to get good grades (high motivation + hard work)

- Regularly attend the classes and take notes
- Refresh timely after each lecture
- Independently work on the homework problems
- Improve capability for numerical analysis and theoretical proof
- Seriously deal with the course projects

Course resources

- http://blackboard.iit.edu – assignments, assignment solutions, additional distributes

Future Networking Research Lab (FunLab)

- Wireless network performance analysis and protocol design
- Next-generation Internet architecture, protocols, and management
- Internet and wireless network security
- Integration of heterogeneous networks