

ENGR 5640G Advanced Wireless Communications (Fall 2009)

Instructor: Prof. Min Dong
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Lectures: Friday: 2:10PM – 5:00PM @ University Pavilion UL2

Course Website: WebCT

Office Hours: Thursday: 3:00PM – 4:00PM, or by appointment

Prerequisites: ENGR 3070U and ENGR 3130U, or equivalent; If you are not sure whether or not classes from other universities satisfy the prerequisites, speak with the professor. ENGR 4130U (preferred)

Textbooks: 1. Lecture notes and handouts
2. *Wireless Communications*, by Andrea Goldsmith, Cambridge University Press (In campus store; also on Library reserve)

Reference Books:

1. *Fundamentals of Wireless Communications*, by David Tse and Pramod Viswanath, Cambridge University Press 2005. (also available <http://www.eecs.berkeley.edu/~dtse/book.html>)
2. *Wireless Communications - Principles and Practice*, by Theodore Rappaport, 2nd Edition, Prentice Hall.
3. *Digital Communications*, by John Proakis and Masoud Salehi, 5th Edition, McGraw-Hill 2008 (or 4th Edition 2001).

Course Objectives: This is a graduate course on the theory and analysis of wireless communications, with an emphasis on the understanding of the fundamental principles underlying wireless communications. After completing this course, the students are expected to understand the characteristics and performance limits of wireless systems, the techniques and mathematical tools needed to analyze the system, and the in-sight and trade-off associated to the design of wireless systems. The students should also be able to quantify and evaluate the performance of wireless systems, and implement theoretical concepts and techniques to the design for practical communication links.

Course Outline:

- Introduction to wireless communication systems, cellular concept and principles
- Review of probability and stochastic processes
- Wireless fading channel modeling: propagation, pathloss, and multipath channel characterization
- Digital modulation and detection over fading channels

- Diversity techniques: time, frequency, and space diversity
- Multiple antenna (MIMO) and space-time communications
- Multiple access systems
- Capacity of wireless channels

Grading:	Homework	10%	(bi-weekly; approximately 6 sets)
	Project	15%	(final project)
	Midterm exam	35%	
	Final exam	40%	

Course Policies:

Attendance: Attendance is expected during the lecture offering period. Students are responsible for all assignments and announcements made in class, and all material covered in class, whether or not it is in the textbook. Please check the course website at webCT regularly for announcement and homework assignments.

Homework: homework will be assigned roughly on a biweekly basis. Due date will be specified on each homework assignment. Late submission will not be accepted unless prior arrangements are made with me at least 1 day in advance. Each student must have his/her own contribution and should independently write up the homework. Discussion on the problems is permitted, after each student has worked out the problem individually.

Midterm and Final exam: closed-book and close-note exam. Midterm will be in class exam. Students are allowed to bring two 8.5x11 double-sided study sheets. The exact exam date will be announced later. Make-up exam can be arranged for properly authorized absence. It is the university policy that every student must bring his/her own student ID to the exam. Fail to do so will fail the course.

Integrity and Honesty: Academic misconduct impedes the activities of the University community, and is punishable by appropriate disciplinary action. Students are encouraged to read statements on academic misconduct, including plagiarism, cheating, and examination impersonation in the University calendar

http://www.uoit.ca/EN/academicintegritystudent/main/225530/uoit_policies.html.

Any academic misconduct will be dealt according to the relevant portions of section 5 of the calendar. Academic misconduct includes, but is not limited to, the provisions detailed in section 5.15.1. Please read them carefully.

Note: The above topics and outline are subject to adjustments and changes as needed