

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

Department of Electrical Engineering

COURSE SYLLABUS**Course Description**

This course covers the fundamentals of wireless cellular/mobile/personal communications systems. The topics covered include: radio propagation, digital modulation, and error control; access methods: spread spectrum, FDMA and TDMA; antenna diversity, multi-input multi-output systems.

Course Requirements

EE251 Digital Communications is the formal pre-requisite for the course. This course is for graduate students only, and it assumes familiarity with digital communications and statistics/probability which is used heavily in this course.

Course Outline

The following is a tentative course schedule. The number in brackets is the (approximate) lecture number.

- Introduction [1]
- Propagation models for wireless (outdoor, indoor) [2-4]
- Performance analysis for digital modulation over fading channels [5-6]
- Capacity of fading channels [7]
- Adaptive modulation [8-9]
- Multiple antenna systems: diversity, MRC, transmit diversity, MIMO [10-11]
- Channel equalization [12-14]
- Coding and interleaving [15]
- Multiple access methods: FDMA/TDMA/CDMA [16]
- Spread spectrum and RAKE receivers [17]
- Issues in multiple access: interference, power control [18]
- Multiuser communication and capacity [19]

Class Time and Location Lecture times: M W 5:00-6:45pm. Engineering II room 194.

First class: M 3/30/2009

Last class: W 6/3/2009

Holiday: M 5/25/2009 (memorial day)

Reference Books

“Fundamentals of Wireless Communication,” by D. Tse and P. Viswanath, Cambridge University Press 2005, ISBN-10: 0521845270, ISBN-13: 978-0521845274.

“Wireless Communications,” by Andrea Goldsmith, Cambridge University Press, 2005, ISBN 0521837162

The following books are recommended for supplemental reading:

- Wireless Communications - Principles and Practice by Theodore S. Rappaport Prentice Hall ISBN 0130422320
- Principles of Mobile Communications, Gordon L. Stuber, Kluwer Academic Publishers ISBN 0792397320

Grading Policy

Course grade will be based on the homeworks (20%), the midterm exam (30%), and project (50%). The project grade breakdown: proposal submission (10%), presentation (20%), report (20%).

Project

A final project will be required (there will be no final exam). The details are described in a separate handout.

Academic Dishonesty

Any confirmed academic dishonesty including but not limited to copying homeworks or cheating on exams, will result in a no-pass or failing grade. You are encouraged to read the campus policies regarding academic integrity. Examples of cheating include (but are not limited to): Sharing results or other information during an examination. Working on an exam before or after the official time allowed. Submitting homework that is not your own work. Reading another student’s homework solution before it is due. Allowing someone else to read your homework solution before the assignment is due.

For more details see the Official UCSC Guideline on Academic Integrity.