

Syllabus

TM615WS: Wireless Communications and Mobile Computing

Overview

A broad overview of cellular wireless and personal communication networks is provided. This course examines the fundamentals of mobile wireless networking, including the tradeoff between capacity and coverage in a cellular system and the role of frequency reuse, cell sectorization, and cell splitting. It explores second-generation radio architecture and the multiple access techniques of TDMA and CDMA together with the principal 2G standards (GSM and ANSI-95). The importance of wireless data in mobile wireless networking is also discussed. The major 2.5G TDMA standards (GPRS and EDGE) are examined and an introduction is provided to 3G systems (cdma2000 and UMTS).

Prerequisites: TM601, TM605, and TM610

Introduction to Course

- ❑ Challenging and comprehensive course.
- ❑ Three quizzes, one midterm, a comprehensive final, and an individual project.
- ❑ All quizzes and exams are closed notes and closed books.
- ❑ All lecture notes, homework assignments and solutions, project description, and this course syllabus are available on the WebCT course web site. It is your responsibility to download the required material from the course website.
- ❑ Audio sessions of my lectures will be available via the course web site. These lectures are not to be stored or copied.
- ❑ The course calendar, located at the end of this syllabus, is subject to change. Any changes that may be required will be posted on the course web site.
- ❑ Homeworks are assigned weekly and are due on **Tuesday** of the following week (by 11:59 PM Eastern United States time). You can submit your homework to my WebCT email address or you can fax to me at: 1-201-216-5385. Please include a cover sheet with my name.
- ❑ Homework assignments handed in up to one week late will have a 50% penalty. No homework will be accepted after one week from the original due date.
- ❑ Guidelines for an INC: Student has completed a significant portion of the course, is in good standing, and has an emergency (e.g. work or family). Student must request a grade of INC in writing.
- ❑ You must read, sign, and submit the ethical statement found in this course syllabus. (You can fax the signed form to me or you can scan and send to my WebCT email account).

Relationship of Course to Rest of Curriculum

This is the fundamental wireless course and is the foundation for other courses in the management of wireless networks curriculum.

Learning Goals

Upon successful completion of this course the student will:

1. Understand the trade-off between capacity and coverage in a mobile wireless system and the role of frequency reuse, cell sectorization, and cell splitting in the planning and design of a cellular-based wireless system.
2. Describe and draw a block-diagram of a generic second generation digital radio. Discuss the trade-offs in the design of the various functional blocks.
3. Describe and compare the network and protocol operation of the two major 2G cellular wireless networking standards: GSM and ANSI-95.
4. Identify the importance and discuss the high-level operation and architecture of selected 2.5G and 3G wireless networking standards.
5. Discuss the various paths in the evolution to 3G wireless networks.

Pedagogy

The course will employ audio lectures, an individual project, and individual weekly homework assignments. Audio sessions of the lecture material and the corresponding lecture notes will be available on the course web site. There will also be quizzes, and a midterm, and a comprehensive final exam.

Required Text(s)

None. An optional text is: "Principles of Wireless Networks: A Unified Approach" by Kaveh Pahlavan and Prashant Krishnamurthy. Prentice Hall. ISBN 0-13-093003-2. Course lecture notes are available on the course web site.

Required Readings

Articles will be provided as needed.

Additional Readings

None

Assignments

- Weekly comprehensive homework assignments
- An individual project

Grading	Grade Percent
Weekly Homework Assignments	5
Three Quizzes: (No quiz score is dropped)	15
Midterm Exam	30
Final Exam	40
Individual Project	10
Total Grade	100%

Ethical Conduct

The following statement is printed in the Stevens Graduate Catalog and applies to all students taking Stevens courses, on and off campus.

“Cheating during in-class tests or take-home examinations or homework is, of course, illegal and immoral. A Graduate Academic Evaluation Board exists to investigate academic improprieties, conduct hearings, and determine any necessary actions. The term ‘academic impropriety’ is meant to include, but is not limited to, cheating on homework, during in-class or take home examinations and plagiarism.”

Consequences of academic impropriety are severe, ranging from receiving an “F” in a course, to a warning from the Dean of the Graduate School, which becomes a part of the permanent student record, to expulsion.

Reference: The Graduate Student Handbook, Academic Year 2003-2004 Stevens Institute of Technology, page 10.

Consistent with the above statements, all homework exercises, tests and exams that are designated as individual assignments **MUST** contain the following signed statement before they can be accepted for grading.

I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination. I further pledge that I have not copied any material from a book, article, the Internet or any other source except where I have expressly cited the source.

Signature _____

Date: _____

Please note that assignments in this class may be submitted to www.turnitin.com, a web-based anti-plagiarism system, for an evaluation of their originality.

Course Schedule

Class Meeting	Topic Covered
1	Introduction to Mobile Wireless Communications
2	Overview of RF Engineering Fundamentals: Part One
3	Overview of RF Engineering Fundamentals: Part Two
4	Generic Digital Radio
	Quiz One: (Covers first two class meetings)
5	GSM: Part One
6	GSM: Part Two
	Quiz Two: (Covers lectures Three and Four)
	Quiz Two is Reviewed
	Your project topic and one-paragraph description of your project is due by the start of class
7	Midterm Exam: Covers first six lectures
8	CDMA Fundamentals
9	ANSI-95: Part One
10	ANSI-95: Part Two
11	Introduction to GPRS and EDGE
	Quiz Three: (Covers the first two lectures after the midterm exam)
12	Presentation of Individual Projects
13	Comprehensive Final Exam