

TCOM-606: Advanced Mobile Communications Systems Spring 2007

Instructor: Joe Herman
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Time and Place: Monday 7:20pm – 10:00pm
Enterprise Hall - Room 176

Office Hours: Monday 6:30pm – 7:10pm and by appointment

Required Texts:

Harte, Levine, and Kikta, *3G Wireless Demystified*, McGraw-Hill, 2002
Smith and Collins, *3G Wireless Networks*, McGraw-Hill, 2002

References:

1. Kaveh Pahlavan and Prashant Krishnamurthy, *Principles of Wireless networks*, Prentice Hall, ISBN 0-13-093003-2, 2002
2. Savo G. Glisic, *Advanced Wireless Communications: 4G Technologies*, John Wiley & Sons, ISBN: 0470867760, 2004
3. William Stallings: *Wireless Communications and Networks*, Prentice Hall, ISBN 0-13-040864-6, 2002
4. Jon W. Mark and Weihua Zhuang, *Wireless Communications Networking*, Prentice Hall, ISBN 0-13-040905-7, 2003
5. Clint Smith and Daniel Collins, *3G Wireless Networks*, New York, NY, McGraw-Hill, 2002
6. David J. Goodman, *Wireless Personal Communications Systems*, Reading, MA, Addison-Wesley, 1997
7. Cameron Kelly Coursey, *Understanding Digital PCS: The TDMA Standard*, Boston, MA, Artech House, 1998
8. Joachim Tisal, *The GSM Evolution: One Step Towards UMTS Second Edition*, New York, NY, John Wiley and Sons, 2001
9. Vijay Garg, *Wireless Network Evolution: 2G to 3G*, Upper Saddle River, NJ, Prentice-Hall, 2001
10. Harri Holma and Antti Toskala, *WCDMA for UMTS Radio Access for Third Generation Mobile Communications*, New York, NY, John Wiley and Sons, 2001
11. Charles N. Thurwachter, *Wireless Networking*, Prentice Hall, ISBN 0-13-088366-2, 2002

Homework: Reading assignments will be assigned each week. Problem solving (graded) assignments will be given as appropriate to the lecture material.

Quizzes: Throughout the semester, quizzes will be given to reinforce material provided in class and to prepare the student for the midterm and final exams. Quizzes will be announced one week prior to the quiz date

Exams: There will be both a midterm and a comprehensive final exam. The final will be given during the assigned exam time.

Final Grades: Final grades will be determined as a weighted average of the homework, quiz score, midterm, and final exam in the following way:

Homework	15%
Quiz	20%
Midterm	30%
Final	35%

Tentative Course Schedule

Week 1

Introduction

- Overview of wireless communication systems
- Paging and 1st generation cellular services
- Transition from analog cellular to digital cellular (US vs. European experience)
- Features and services of 2G, 2.5G, 2.75G, and 3G systems (i.e. advanced calling services, mobile data, mobile internet, and etc.)..

Week 2

Wireless Communication Concepts

- Propagation models; Multiple access methods; Wireless layer protocols; Antennas

Week 3

Cellular System Concepts

- Market and technology overview; Cell splitting; Cellular system economics, cellular design concepts; intersystem operation and roaming

Week 4

Personal Communications Services

- Overview
- PCS philosophy
- Advanced calling services and features
- Worldwide spectrum allocations and implementations

Week 5

2nd Generation FDMA/TDMA Cellular Systems

- GSM Part 1 – over-the-air design concepts

Week 6

2nd Generation FDMA/TDMA Cellular Systems

- GSM Part 2 – Handoff; Roaming; Security

Week 7

MID-TERM EXAM

Week 8

CDMA Cellular Systems

- CDMA concepts
- IS-95 (CDMAone) Part 1 – over-the-air design concepts

Week 9

CDMA Cellular Systems

- IS-95 (CDMAone) Part 2 – Handoff; Power Control; Security

Week 10

CDMA2000

Week 11

Transition to Third Generation GSM (2.75G)

- GSM data service evolution from circuit-switched to packet-switched, packet switching center, Mobile IP
- SMS, MMS, E-SMS
- GPRS and EDGE (EGPRS)

Weeks 12-13

WCDMA – The move to 3rd Generation GSM

- Over-the-air concepts; Handoff; Power Control; Security
- HSDPA and HSUPA

Week 14

Competitive/Complementary Technologies

- Satellite Mobile Systems
- WiFi and WiMax

Week 15

Final exam