

ECS 455 Mobile Communications Announcements

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Office Hours:

BKD 3601-7

Tuesday 15:00-16:00

Friday 14:00-16:00

Course Organization

prapun.com/ecs455

- **Course Web Site:**

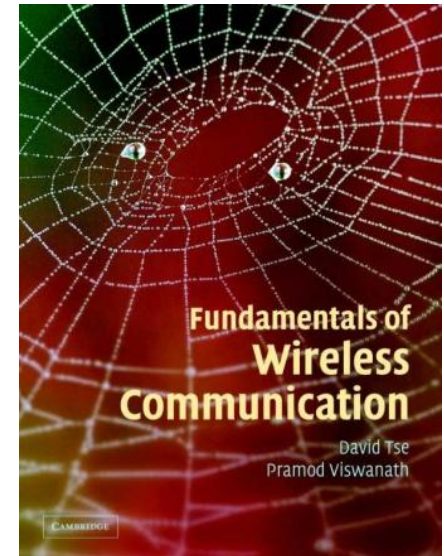
<http://www2.siit.tu.ac.th/prapun/ecs455/>

- **Lectures:**

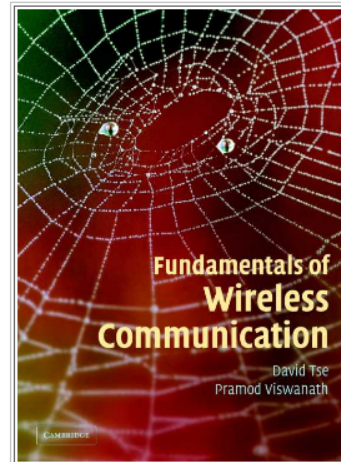
- **Tuesday** 13:00-14:20 BKD 3509
- **Friday** 10:40-12:00 BKD 3509

- **Textbook:**

- **Fundamentals of Wireless Communication**
 - By D. Tse and P. Viswanath
 - Cambridge University Press, 2005
 - Companion Site: <http://www.eecs.berkeley.edu/~dtse/book.html>



Tse's Web Site



Fundamentals of Wireless Communication

[David Tse](#) and [Pramod Viswanath](#)

[Cambridge University Press](#), 2005

Buy the book: [Cambridge University Press](#)

[Amazon.com](#)

[BookFinder.com](#)

All chapters of the textbook can be downloaded.

<http://www.eecs.berkeley.edu/~dtse/book.html>

Now with exercises included!

1. Introduction; [PDF](#)
2. The wireless channel; [PDF](#)
3. Point-to-point communication: detection, diversity and channel uncertainty; [PDF](#)
4. Cellular systems: multiple access and interference management; [PDF](#)
5. Capacity of wireless channels; [PDF](#)
6. Multiuser capacity and opportunistic

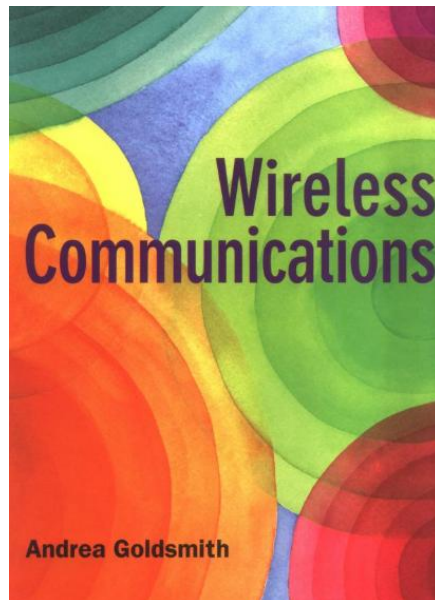
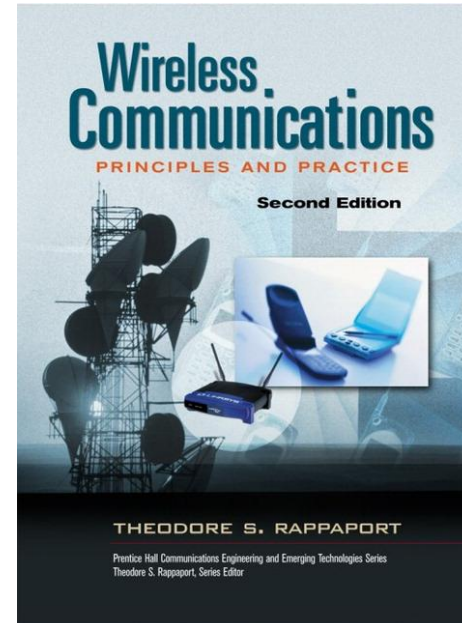
Book Description

The past decade has seen many advances in physical-layer wireless communication theory and their implementation in wireless systems. This textbook takes a unified view of the fundamentals of wireless communication and explains the web of concepts underpinning these advances at a level accessible to an audience with a basic background in probability and digital communication. Topics covered include MIMO (multiple input multiple output) communication, space-time coding, opportunistic communication, OFDM and CDMA. The concepts are illustrated using many examples from wireless systems such as GSM, IS-95 (CDMA), IS-856(1xEV-DO), Flash OFDM and ArrayComm SDMA systems. Particular emphasis is placed on the interplay between concepts and their implementation in systems. An abundant supply of exercises and figures reinforce the material in the text. This book is intended for use on graduate courses in electrical and computer engineering and will also be of great interest to practicing engineers.

[Reviews](#)

More References

Theodore S. Rappaport,
“*Wireless Communications:
Principles and Practice*,” 2nd
Edition, Prentice Hall PTR, 2002.



A. Goldsmith, “*Wireless
Communications*,”
Cambridge Press, 2005.

More references after
the midterm.

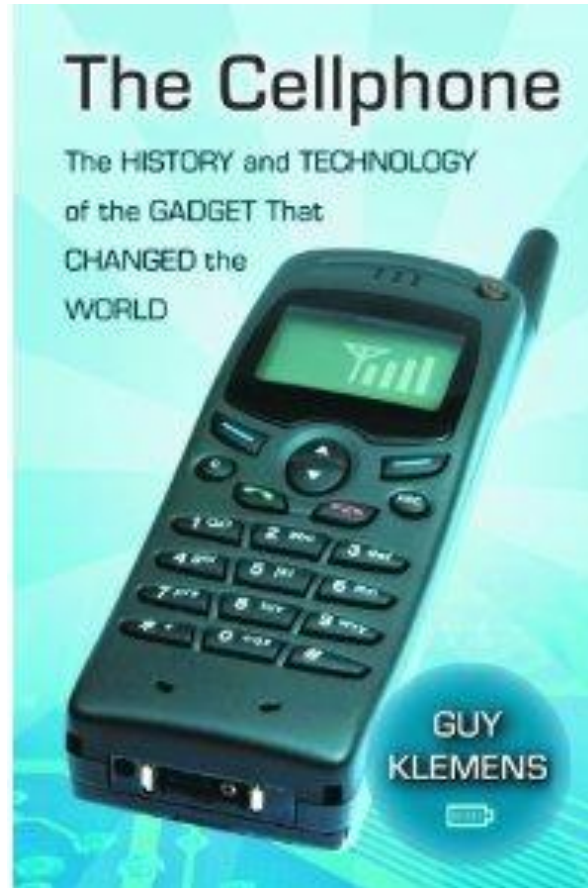
Announcement (L5: Nov 23)

- Submit HW1 today. (Box provided in the TC/EC office).
 - Don't have to submit in class.
 - Please don't do the HW in lecture.



- Tuesday lecture moved (again) to 2:40PM; same room.

Easy-to-Read yet Related Book



Announcement (L2: Nov 12)

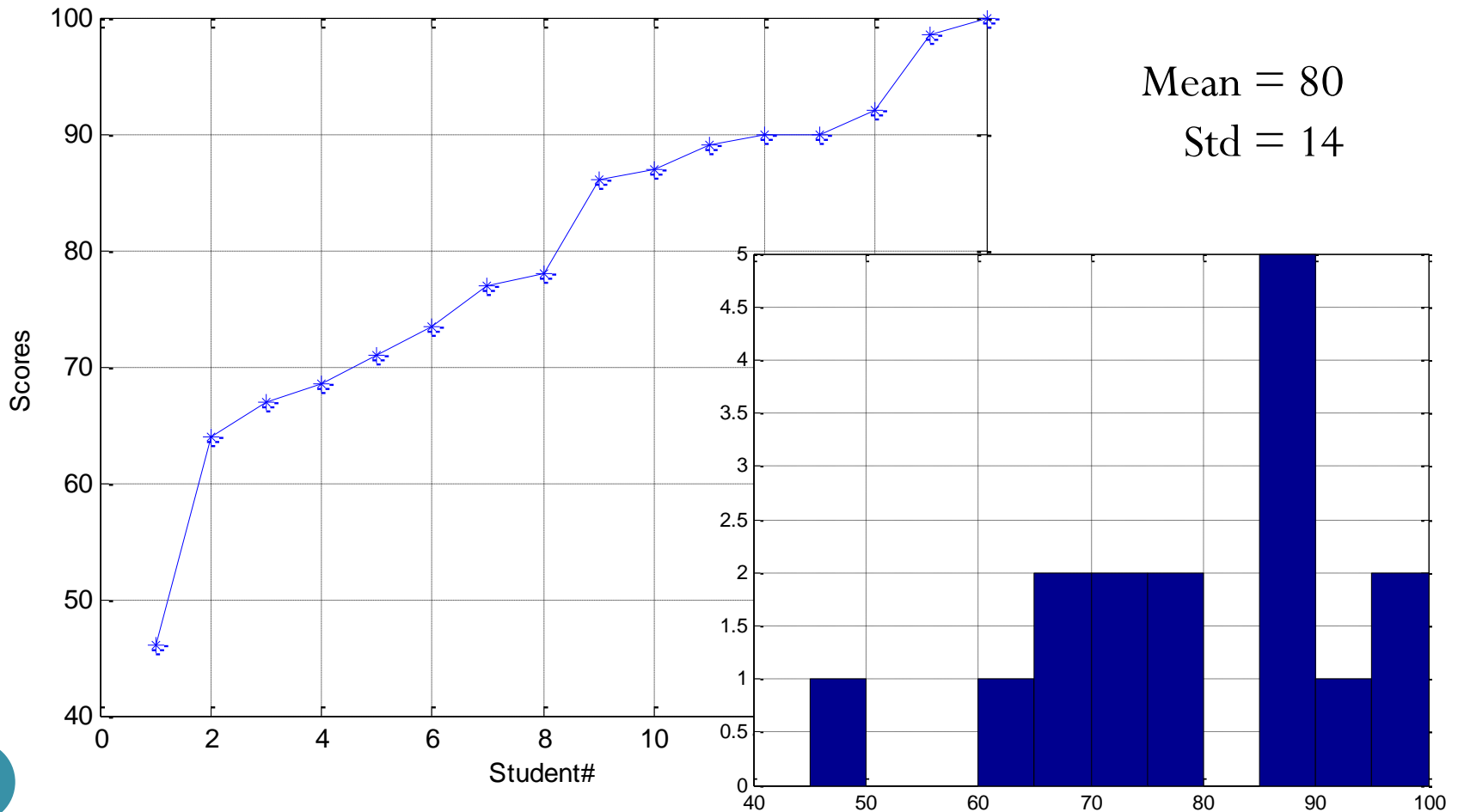
- HW1 posted. Due Nov 23 (Tuesday)
- Tuesday lecture moved to 1 PM; same room.

Announcement (Dec 14)

- HW3 is posted.
- Information regarding midterm exam
 - Date: 24 Dec 2010
 - TIME: 09:00 - 12:00
 - ROOM: BKD 3206
 - Closed book. Closed notes. No cheat/study sheet.
 - Basic calculator allowed

Announcement (Jan 4)

- Midterm Scores:

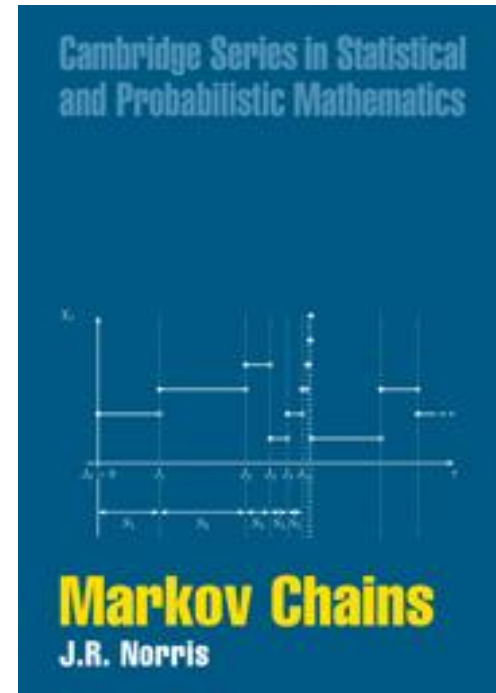


Announcement (Jan 11)

- HW4 is posted.
 - For the last question, assume that $A < m$.

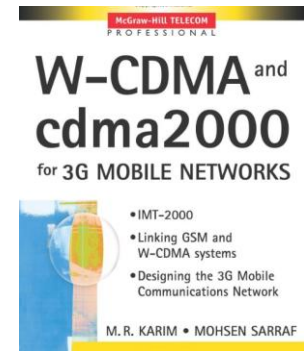
Reference: Markov Chain

- The "best" introductory textbook on Markov chain is probably the one written by Norris.
- This will be an overkill for this class but it serves as a good reference if you want to dig into this topic further.
- There are some sample chapters available on the web as well.

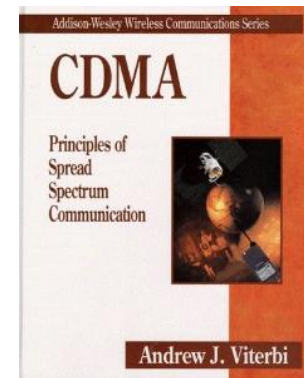


References: m-sequences

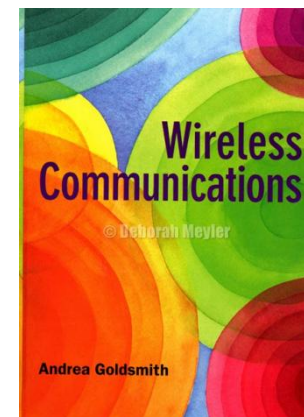
- Karim and Sarraf, *W-CDMA and cdma2000 for 3G Mobile Networks*, 2002.
 - Page 84-90
- Viterbi, *CDMA: Principles of Spread Spectrum Communication*, 1995
 - Chapter 1 and 2
- Goldsmith, *Wireless Communications*, 2005
 - Chapter 13
- Tse and Viswanath, *Fundamentals of Wireless Communication*, 2005
 - Section 3.4.3



[TK5103.452 K37 2002]

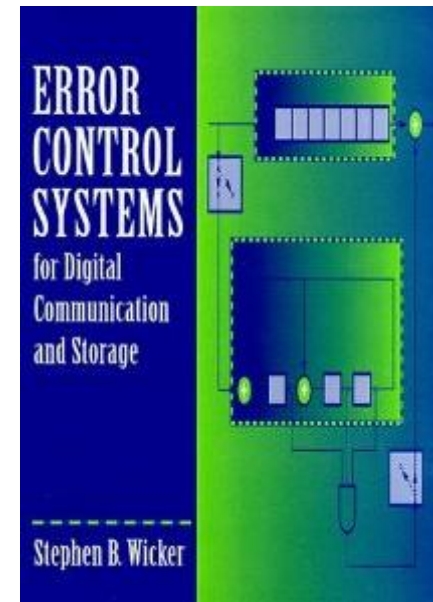


[TK5103.45 V57 1995]



Reference: Coding Theory

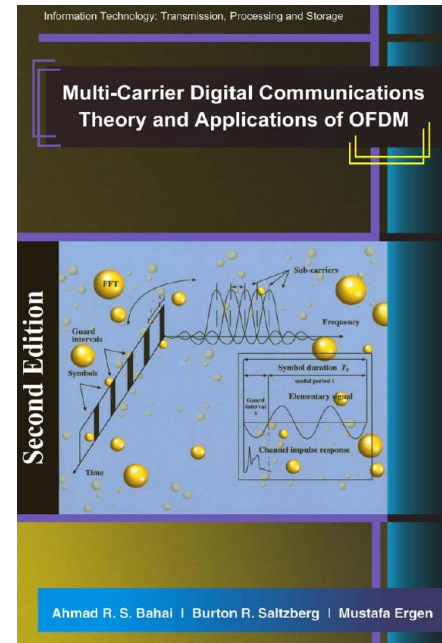
- For those who want to know more about *Galois Field* and its application including the use of *primitive polynomials*, one of the best book in the market is written by Prof. Stephen B. Wicker.
- Stephen B. Wicker, *Error Control Systems for Digital Communication and Storage*, 1994



[TK5103.7W53 1995]

Reference: OFDM

- A. Bahai, B. R. Saltzberg, and M. Ergen, *Multi-Carrier Digital Communications: Theory and Applications of OFDM*, 2nd ed., New York: Springer Verlag, 2004.



Final Exam

- 4 Mar 2011 (Friday)
- 9AM – 12PM
- BKD 3206
- More information will be posted on the course web site.
- Cover all the topics that were presented in lectures/HWs.
 - Cumulative
 - Focus on the materials that haven't been on the midterm.

Cheat Sheet?

- Closed book. Closed note.
- No cheat sheet.
- There is a sheet available in the HW box.
- Each one of you can fill in any text/formula that you want.
 - Max. 50 symbols/characters.
 - Have to fit inside your own box.
- Deadline: 12PM, Mar 2
- Scanned copy will be posted on Mar 2.
- Copies of this sheet will be included in the exam.

ECS455 Formula Sheet

ID3	
055	
075	
077	
217	
370	
381	
478	
491	
538	
611	
652	
788	
934	
977	
985	
991	

These formula are provided...

$$2\cos^2 x = 1 + \cos 2x$$

$$2\sin^2 x = 1 - \cos 2x$$

$$G(f) = \int_{-\infty}^{\infty} g(t) e^{-j2\pi ft} dt$$

$$\cos(2\pi f_c t + \theta) \xrightarrow{\mathcal{F}} \frac{1}{2} \delta(f - f_c) e^{j\theta} + \frac{1}{2} \delta(f + f_c) e^{-j\theta}$$

$$g(t - t_0) \xrightarrow{\mathcal{F}} e^{-j2\pi f t_0} G(f)$$

$$e^{j2\pi f_0 t} g(t) \xrightarrow{\mathcal{F}} G(f - f_0)$$

$$g(t) \cos(2\pi f_c t) \xrightarrow{\mathcal{F}} \frac{1}{2} G(f - f_c) + \frac{1}{2} G(f + f_c)$$

$$\text{DFT: } X[k] = \sum_{n=0}^{N-1} x[n] \exp\left(-jnk \frac{2\pi}{N}\right)$$

$$\text{IDFT: } x[n] = \frac{1}{N} \sum_{k=0}^{N-1} X[k] \exp\left(jnk \frac{2\pi}{N}\right)$$

Self-Evaluation Form

- Due date: 12PM, Mar 2

Name _____ ID _____



Sirindhorn International Institute of Technology
Thammasat University at Rangsit
School of Information, Computer and Communication Technology

ECS 455: Self-Evaluation (2)

Instructions

1. The class participation score for this class is judged from how much you actively participate in the class discussion both inside and outside of the classroom.
2. Please honestly answer the following questions. Please provide as much information as possible. Do not include the activities that you have already stated in the first self-evaluation form distributed before the midterm.
3. Your answer will be read in detail and it may influence the actual score.

Questions

1. How many times have you been absent from the class? Are there any specific reason(s)? Please explain.
2. How many times have you been late (> 3 mins) for the class? Are there any specific reason(s)? Please explain.
3. How many times have you left the class early (> 3 mins)? Are there any specific reason(s)? Please explain.
4. How many times have you participated (provided comments, asked questions, answered questions, etc) in the lectures? Be specific. Provide some short description for each event. (You may put this on another sheet of paper.)