EE 4640 Communication Systems II (通訊系統 II)

Lecture time: **W3 W4 F4,** Classroom: 台達 **202**, EECS Building
(Fall Semester 2012)
Instructor: 祁忠勇 (Chong-Yung Chi), Office: Room 723, EECS Building
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This is a core fundamental course for students who would like to understand or enter the field of communication engineering. As Analog Communication has been covered in the course "Communication Systems I", this course is designed in parallel with "Communication Systems I" and will cover principles of *Digital Communication*. For students to take this course, the background of "Communication Systems I" is preferred, but not a must.

For the practicing engineer in the communications industry and those who (such as seniors and beginning graduate students) plan to have communications as major field, this course is essential to building background in *digital communications*. For those who are to engage in signal processing and IC design for communications, this is also a course worth taking.

Background: Probability Theory, Signals and Systems

Course Outline:
1. Introduction to Random Processes (Review) (Chapter 1)
2. Signal-Space Analysis (Chapter 5)
3. Passband Digital Transmission (Chapter 6)
   Sec. 6.1-6.10, Sec. 6.12-6.14
4. Spread-Spectrum Modulation (Chapter 7)
   Sec. 7.1-7.7
5. Multiuser Radio Communications (Chapter 8)
   Sec. 8.1, 8.2 Multiple access
   Sec. 8.5 Wireless Communication
   Sec. 8.6 Statistical characterization of multipath channels
   Sec. 8.7 Binary signaling over a Rayleigh fading channel
6. Fundamental Limits in Information Theory (Chapter 9)
   Sec. 9.1 Introduction
   Sec. 9.2 Uncertainty, information, and entrpopy
   Sec. 9.5 Discrete memoryless channels
   Sec. 9.6 Multual information
   Sec. 9.7 Channel capacity

Textbook:

1. Simon Haykin, Communication Systems, 4th Edition, Wiley & Sons, 2001.

References:

1. Rodger E. Ziemer and William H. Tranter, Principles of Communications: Systems, Modulation, and Noise, 6th Edition, Wiley & Sons, 2010.
2. Simon Haykin and Michael Mohher, Introduction to Analog & Digital Communications, 2nd Edition, Wiley & Sons, 2007.

Grading and Examination Dates:

Homework: **0%**
Midterm Exam. 1: **30%**,
Midterm Exam. 2: **30%**,
Final Exam.: **40%**,

Teaching Assistants and Office Hours: To be determined

Remarks:

1. No make-up tests will be given for mid-term and final examinations at any cost.
2. Homework will be corrected and we will keep records which will be beneficial to his (her) term grade.
3. My lecture notes will be post on my web page for you to download at suitable time frame.