Sirindhorn International Institute of Technology

Thammasat University

School of Information, Computer and Communication Technology

ECS 452: Course Syllabus

Semester/Year: 2/2015

Course Title: Digital Communication Systems
Instructor: Asst. Prof. Dr.Prapun Suksompong (prapun@siit.tu.ac.th)
Course Web Site: http://www2.siit.tu.ac.th/prapun/ecs452/

Please check the course web site regularly for updated information about this course.

Lectures

- Wednesday   13:00-14:20   BKD 3214
- Thursday   14:40-16:00   BKD 3214

You are STRONGLY encouraged to attend lectures. (See the grading policy below.)

Course Information

Prerequisite: ECS 332 or consent of Head of School

Course Description: The subject of digital communications involves the transmission of information in digital form from a source that generates the information to one or more destinations. This course extends the knowledge gained from ECS332 (Principles of Communications) and ECS315 (Probability and Random Processes). Basic principles that underlie the analysis and design of digital communication systems are covered.

Textbook: John Proakis and Masoud Salehi, Digital Communications, 5th Edition, McGraw-Hill, 2007.

More References:

1. Robert G. Gallagher, Principles of Digital Communications, Cambridge University Press, 2008.
2. Bernard Sklar, Digital communications: fundamentals and applications, Prentice Hall, 2001
3. Ha H. Nguyen and Ed Shwedyk, A first course in digital communications, Cambridge University Press, 2009

Undergraduate Student Dress Code:
- Undergraduate students must wear Thammasat University uniform OR polite dress.
- Plain white shirt, properly tucked in.
- Plain trouser/skirt in dark color.
- The followings are not allowed:
  - Sandals
  - T-shirt (even with the shop shirt)
  - Polo-shirt (even with the shop shirt)

Grading Policy: Coursework will be weighted as follows:

Assignments	5%
In-Class (Group) Exercises	5%
Class Discussion/Participation	**10%**
Midterm Examination	40%
9 Mar 2016 TIME 13:30 - 16:30	
Final Examination (comprehensive)	40%
18 May 2016 TIME 13:30 - 16:30	

- The lowest in-class exercise score will be dropped.
  Similarly, the lowest assignment score will be dropped.
- Late assignments will be heavily penalized or rejected.
- Cheating will not be tolerated

Assignments: Homework will be assigned throughout the semester. For each assignment, only part(s) of a selected problem will be graded. Of course, you do not know which problem will be selected; so you should work on all of them. The complete solutions (not just answers) to all problems will be posted on the course web site.

In-Class Exercises: In-class exercises will focus on current and previous topics. An exercise may be given at any time during any class period. Students are expected to work in groups of four persons. There will be no make-up exercise.

Exams: An A4 study sheet is allowed. One side for the midterm exam. Another side for the final exam.

Students should notify the instructor before missing any exam if at all possible and immediately thereafter when not possible. The instructor (and/or the fact-finding committee) will determine if the absence from an exam is legitimate. Simply not feeling well is not a reason to miss an exam. In the case of legitimate absence, an oral and/or written make-up exam could be arranged.

Expectations: You should expect to spend extra 5-8 hours per week studying outside of class. However, I do expect you to come to class and _participate actively_ in class discussions. If you must miss a class, I expect you to find out and catch up with what happened in lecture, either from me or one of your classmates. You are responsible for all materials that are discussed in class.

Academic Integrity: The work you submit in ECS 452 is expected to be the result of your individual effort. You are free to discuss course material, approaches to problems with your colleagues or the instructor but you should never misrepresent someone else's work as your own.

It is your responsibility to protect your work from unauthorized access. For example, do not discard copies of your codes/assignments in public places.

Course Outline

The following is a tentative list of topics.

1. Elements of a Digital Communication System
2. Source Coding and Entropy
3. Optimal Detection for Discrete Memoryless Channels
4. An Introduction to Channel Coding and Decoding over BSC
5. Mutual Information and Channel Capacity
6. Introduction to Digital Modulation, Signal Space Representation of Waveforms, Constellations for Digital Modulation Schemes
7. The Waveform Channel, Random Processes, White Noise
8. Optimal Detection for Additive Noise Channels, Matched filter.

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