TEKNILLINEN KORKEAKOULU
TEKNISKA HÖGSKOLAN
HELSINKI UNIVERSITY OF TECHNOLOGY

S-72.2205
Digital Transmission Methods

Lectures autumn 2008

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Department of Communications and Networking (Comnet)

Course status

- Compulsory course for students studying A2 module “Tietoliikenteen siirtojärjestelmät” S114-2 according Study guides 2007 ➔.
- **Prerequisites**
  - S-72.1140 Transmission Methods in Telecommunication Systems (5 cr)
- **Course targets**
  - The course provides basic knowledge on baseband processing in the physical layer of communication systems.
  - Main target: to understand effects of the channel on a communication system and how that affects performance.
  - Framework encompasses both wireless and wired environments.

Teachers

- Lecturers:
  - Professor Olav Tirkkonen, reception Tue 11.00, E 218.
  - Teaching Researcher Kalle Ruttik, reception Tue 11.00, E215
- Course assistants
  - MSc Wei Lu
  - MSc Helka Määttänen

Lectures and Exercises

- Lectured every academic year
- Lectures starting on November 4 are held on
  - Tuesdays 12 – 14 in Room H302
  - Thursday 12 – 14 in Room H302
- Exercises starting on November 6 are held on
  - Thursdays 10 – 12 in Room H302
- There are 7 home assignments, and 3 matlab assignments which will be checked and graded and they will contribute to the final course grade.

Literature

- Lecture handouts
- S. Haykin, M. Moher:
  - Modern Wireless Communications
  - Prentice Hall 2004, 560p, chapters 2.1 – 2.8, 3, 5.1-5.4, 6.1, 6.2.

Course Grading

- Exam
  - The exam requirements consists of the material distributed to the students and the indicated chapters of the course book.
    - The exam is a closed-book exam with five tasks.
    - Calculators are allowed.
    - The general exam rules in TKK are followed.
    - One bonus point to exam if student fills course evaluation form
  - First exam 17.12. 2008, 9-12 in room S5.
  - Second exam 12.1. 2009, 9-12, in room S4

Course Grading II

- Home Assignments
  - Integral part of the course
  - Home assignments
    - analytic home excercises
  - Programming excercises
    - analysis using a matlab platform
- Grade
  - The exam is graded from 0 to 4
    - with 1-digit accuracy, maximum 4.4
  - The assignments are graded from 0 to 1
    - 1-digit accuracy
  - The course grade is

    min(round(exam grade + assignment grade), 5)*min(round(exam grade),1)
    - at least grade 1 is required from the exam
    - grade 5 possible only with good exam grade **and** good assignment grade

S-72.2205 Lecture plan 2008

Week	Lecture	Time	Topic
45	1	4. 11. 2008	Communication transceiver. Source Coding.
	2	6. 11. 2008	Quantization. Optimum reception principles.
46	3	11. 11. 2008	Signal space representation.
	4	13. 11. 2008	Linear Modulation.
47	5	18. 11. 2008	Pulse shaping.
	6	20. 11. 2008	Continuous Phase Modulation.
48	7	25. 11. 2008	Fading multipath channel, frequency selectivity.
	8	27. 11. 2008	Fading multipath channel, time selectivity, statistical channel models
49	9	2. 12. 2008	Linear modulation over fading multipath channels, equalization.
	10	4. 12. 2008	Diversity combining and fading countermeasures.
50	11	9. 12. 2008	Principles of CDMA.
	12	11. 12. 2008	Principles of OFDM.