#### **Bilkent University** Department of Electrical and Electronics Engineering

# **EEE 432 TELECOMMUNICATIONS II**

#### Spring 2008 Semester General Information & Course Syllabus

Instructor:	Dr. Defne Aktaş, EA-205
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	Office Hours: Wed. 10:40-11:30, Fri. 10:40-11:30, or by appointment
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**Lectures:** Wed. 11:40-12:30, Fri. 8:40-10:30, EB-202

Course website: http://www.ee.bilkent.edu.tr/~ee432

<u>Course Description</u>: In this course, the basic concepts behind the design and analysis of digital communication systems will be introduced. Topics covered in class include sampling and quantization of analog information sources, digital pulse modulation techniques, signal space representation and analysis of digital signals, digital baseband modulation and demodulation, probability of error analysis, spectral shaping and intersymbol interference, digital bandpass transmission and error control coding.

# Prerequisites by topic:

- 1. Basic concepts of modulation/demodulation (EEE 431)
- 2. Probability theory (MATH 250)
- 3. Linear system theory and signal representations (EEE 321)
- 4. Knowledge of a computing tool (preferably Matlab or else Maple, C/C++, etc.)

Textbook: Simon Haykin, Communication Systems, John Wiley & Sons, 2001.

#### **References:**

- John G. Proakis and Masoud Salehi, *Communication Systems Engineering*, 2nd edition, Prentice Hall, 2002.
- Bernard Sklar, *Digital Communications: Fundamentals and Applications*, Prentice Hall, 1988.
- John B. Anderson, Digital Transmission Engineering, Prentice Hall, 1999.

- B. P. Lathi, Modern Digital and Analog Communication Systems, Oxford Press, 1998.
- Leon W. Couch, Digital and Analog Communication Systems, Prentice Hall, 1996.

### **Course Outline:**

- 1. Introduction to digital communication systems
- 2. Pulse modulation (Chapter 3)
- 3. Signal Space Analysis (Chapter 5)
- 4. Digital baseband transmission (Chapter 4)
- 5. Intersymbol interference (ISI), spectral shaping and equalization (Chapter 4)
- 6. Digital bandpass transmission (Chapter 6)
- 7. Error control coding (Chapter 10)

#### **Grading:**

Participation	%5
Homeworks:	%10
Project:	%15
Midterm Exam:	%30
Final Exam	%40
Exam Schedule:	
Midterm Exam:	First week of April, probably April

Final Exam: Date will be determined by Faculty of Eng.

# **General Policies:**

**1. Attendance:** The student is responsible for all assignments, changes of assignments, announcements, etc. discussed in the class. Under no circumstances, the instructor will give out her own notes. If you miss a lecture, it is your responsibility to obtain the notes and other information given in class.

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- 2. Late policy: <u>No late assignment will be accepted unless prior arrangements have been made with the instructor.</u> Arrangements must be made at least 24 hours in advance. Emergency situations will be handled on a case by case basis.
- **3.** Honor code: All written material handed in to the instructor (e.g. homeworks, exams, project etc.) must be **student's own**. Copying from any other source will not be tolerated. Failure to comply with the honor code will be considered as a violation of university's Academic Honesty Policy and necessary action will be taken. In the event of copying, both parties will be held equally responsible. <u>Collaboration on the homeworks and the project are strictly forbidden.</u>
- **4. Participation:** You will also be graded on your participation to the course. This will be based on your participation in lectures, your attendance to office hours, your

level of activity in Moodle, i.e., your participation to forums, your response to the questions posted.

- 5. Homeworks: There will be approximately 6 homework assignments. Homeworks will be given on Wednesdays and will be due following Wednesday at <u>17:20pm</u> <u>sharp</u> in instructor's mailbox. Graded homeworks will be returned to the student and the solutions will be posted on the course website.
- **6. Project:** There will be a Matlab project that will include implementation of a digital baseband transmitter and receiver. It will be divided into 3-4 mini projects including implementation of A/D and D/A converter, a simple digital modulator and demodulator and error performance analysis of the designed system.
- **7. Exams:** There will be one midterm exam and one final exam. All exams are closed book and closed notes. In each exam, you are allowed to use a single A4 paper size formula sheet.
- 8. Formula sheets: Crib sheets used in exams must be handwritten. No photocopying from the others, your own notes and books is allowed. You are only allowed to write formulas and theory from the notes and the textbook. No formulas from, steps for the solution of, partial and full solution of any example or any problem from any source are allowed. The crib sheets will be inspected during the exam and those who fail to comply with the rules will have to continue the exam without using the crib sheet.
- **9.** Make-up Exam Policy: Only one make-up exam will be administered during the semester, covering all the topics. The single make-up exam will be given soon after the final exam for those students who have missed an exam with a valid and well-documented excuse that is recognized by the university. If the student misses an exam, it is the student's responsibility to contact the instructor as soon as possible and provide a copy of their medical report properly authorized by the University Health Center and Faculty of Engineering within three working days after the end of report. The instructor reserves the right for an oral make-up exam.
- **10. Email and Course Website:** We will be using Moodle portal for posting announcements, assigning homeworks and projects, collecting project codes, posting homework solutions and grades. The enrollment key for enrolling to EEE432 portal in Moodle will be emailed through BAIS system in the first couple of weeks of the classes.

**<u>Feedback</u>**: If there is an issue in this class information sheet that concerns you or if you believe some important issue is not addressed, please let me know. Also feel free to raise your concerns about the course anytime during the semester.