

Communication Theory

EEE321

Prof. Dr. Serhan Yarkan

Fall '22

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Office Hours:

Tuesday 17:00 - 18:30

Wednesday 17:00 - 18:00

Office: Küçükyalı, B-303

Class Hours: Tuesday 10:00 - 13:00

Class Room: Küçükyalı, B-113

Course Description

Considering the importance of communication systems and networks in our life, this course aims to provide motivation and theory behind modern communication systems. Skills and knowledge obtained in mathematical analysis, signals and systems, and probability theory courses will be combined here to understand the fundamentals of communication theory. Hence, communication theory is one of the fundamental courses in the EE curriculum.

Prerequisites

Mathematical Analysis, Signals, and Systems, Probability Theory, Statistics, Differential Equations, Linear Algebra.

Textbooks

- John G. Proakis, Masoud Salehi - Fundamentals of Communication Systems, Pearson Education Limited, 2nd Edition
- Simon Haykin - Communication Systems, John Wiley & Sons, 5th Edition, International Student Version

Course Logistics

Lectures will be held at Küçükyalı, B-113. In case an update/change takes place, official announcements will be posted on the website.

Voluntary Teaching Assistants

Halil Said Cankurtaran, Abdurrahman Ötkür | Office: Küçükyalı, B-303 (within office hours).

Midterm and Final Exams

- The midterm exam will be all-comprehensive to the point when the exam is held.
- The final exam will be all-comprehensive.

Grading Policy

- In-semester Evaluation
 - Midterm Exam: 40% <, 50% >
 - When applicable: Pop-up quizzes (not more than 10%, included into In-semester evaluations)
- Final Exam: 50%

Course Policies

During Class

Taking pictures, and recording video or audio is not allowed. Put your phone on silent mode or turn it off. In case students are late or students need to leave pay strict attention not to disturb the class session.

Attendance Policy

Attendance is obligatory. According to rules and regulations, students have to meet at least 70% attendance requirement ($\# \text{NumberOfWeeksLectureDelivered} \times 0.7$ will be rounded down) of the course.

Schedule and weekly learning goals [Tentative]

The schedule is tentative and subject to change. The learning goals below should be viewed as the key concepts you should grasp after each week, and also as a study guide before each exam, and at the end of the semester.

- **Week 1:** Introduction and Signals and Systems Recap
- **Week 2:** Complex Baseband Equivalent
- **Week 3:** Ideal Transmission Line and Transform Domain Tools
- **Weeks 4 - 6:** Amplitude Modulation
 - DSB-SC Analysis
 - DSB LC AM
 - SSB AM and Quadrature AM
- **Week 7:** Recap
- **Week 8:** Midterm Exam
- **Week 9 - 10:** Angle Modulation

- **Week 11 - 13:** Stochastic Processes and Noise Process for Communication Systems
 - Analysis of Noise process for Communication Systems,
 - Noise Analysis in AM
 - Effect of Noise on FM
- **Week 14:** Measuring the Efficiency of A Communication System
- **Week 15: Final Exam**