Sabancı University
Faculty of Engineering and Natural Sciences

EE 410 - Information and Coding Theory

Spring 2022-2023
Course Information

We may have to revise the course plan according to the countrywide reassessment to be made regarding higher education. This is expected to happen at the beginning of April. The content to be delivered is certain but the method of course delivery, the number and dates of exams, and some other details are subject to change.

Lecturer	: Hüseyin Özkan, `huseyin.ozkan@sabanciuniv.edu` Room: FENS 1107, Phone: x9594.
Teaching Assistants	Sama Habibi, `samahabibi@sabanciuniv.edu` Can Aksoy, `aksoycan@sabanciuniv.edu`
Textbook	: Elements of Information Theory, 2nd edition, Thomas M. Cover, Joy A. Thomas, 2006.
Lecture Hours	: Wednesday 14:40-16:30 (FENS L047), Thursday 12:40-13:30 (FASS 2023). Note that lectures will be held in classrooms and also online at the zoom link below. So anyone can attend online from home or physical in the classroom.
Zoom	: `https://sabanciuniv.zoom.us/j/99200120569 (Passcode: aep)`
Office Hours (Online)	: Hüseyin Özkan: By appointment, please drop an email to arrange one.
Course Objectives	: To provide students fundamentals of information and coding theory and enable them to develop the background for graduate level studies. To provide students knowledge of practical algorithms regarding compression and communication.
Prerequisite	: Probability and Linear Algebra
Grading Policy	: Midterm 1, 25%; Midterm 2, 25%; Final, 30%; Project/Term paper, 20%.

Topics (tentative schedule):

- Entropy, relative entropy, mutual information [**2 weeks**]
- Asymptotic equipartition property [**1 week**]
- Entropy rate of a stochastic process [**1 week**]
- Source coding: Optimal codes, Kraft inequality, Huffman codes, Fano coding, Shannon-Fano-Elias coding, arithmetic coding [**2 weeks**]
- Channel capacity, and channel coding theorem [**2 weeks**]
- Linear codes, Hamming, LDPC and Convolutional codes [**2 weeks**]
- Differential entropy, and Gaussian channel [**2 weeks**]
- Rate-distortion theory (basics and intuition) [**2 weeks**]

Exams are physical on campus.
There will be two midterms and a final. All of them are closed-book and closed-notes and no electronics devices. The first exam (Midterm 1) will be after 10 April.

Project/Term paper will be discussed and determined later in the class.

Problem Sets
There will be (roughly) 6 homework assignments. These assignments will not be graded. Hence, you are not required to submit your answers. Exams will include problems from these assignments. Hence, you are strongly recommended to study and solve all the assignments thoroughly.

Make-up Policy
There will only be one make-up exam at the end of the semester. Only health or other personal emergencies will be accepted as valid reasons to qualify you for a make-up exam. The make-up exam will cover the entire course material.

SUCourse
We will use SUCourse to distribute problem sets and their solutions, and as a communication medium between you and the staff. If you have any problems accessing the course material on SUCourse, please let us know as soon as possible so we can have such problems fixed.