

**Department:** Mathematics and Computer Sciences

**Division:** Applied Mathematics

**Level and Major:** Graduate

**Course Title:** Coding Theory 2

**Number of Credits:** 3

**Prerequisite:** Coding Theory 1

**Lecturer:**

**Course Description:**

**Course Goals and Objectives:** Introducing modern codes such as LDPC, Turbo and Polar codes, lattice codes and, investigating the latest researches done on their constructions and their performances

**Course Topics:**

- Review of Block codes, review on generator and parity check matrices
- Convolutional codes, Viterbi decoding algorithm
- Turbo codes and their decoding algorithm
- Low-density Parity-check codes, their constructions
- Iterative decoding algorithms including min-sum, sum-product and bit-flipping
- QC-LDPC codes, Photograph based LDPC codes, Algebraic construction of QC-LDPC codes
- Spatially coupled LDPC codes
- Polar codes: encoding, decoding and constructions
- Lattice coding, some classical and modern lattices codes, construction of lattice from codes

**Reading Resources:**

**Evaluation:**