Modern Coding Theory

(Spring, 2022)

☐ **Instructor**: Prof. Kyeongcheol Yang

☐ **Prerequisites**

- Probability and Random Processes
- Error-Correcting Codes (EECE582)

☐ **Text**

Lecture Notes: Available in Classes.

☐ **References**

- Richardson and Urbanke, *Modern Coding Theory*. Cambridge University Press, 2008.
- Recent papers on Turbo codes, LDPC codes, RA codes
- IEEE Transactions on Information Theory, Feb. 2001 (special issue)
- Vucetic and Yuan, *Turbo Codes: Principles and Applications*. Kluwer Academic Publishers, 2000.

☐ **Grading**

- Homework and Attendance: 20
- Project: 20
- Midterm: 30
- Final Exam: 30

☐ Homepage of the Lecture

See the homepage of the *Communications and Signal Design Lab.* (CSDL), POSTECH:

http://csdl-lab.postech.ac.kr/

☐ Course Outline

- Introduction
- Turbo codes: Encoding and Decoding
- Interleaver for Turbo Codes
- Perfomance analysis of turbo codes
- Gallager construction of LDPC codes
- Factor graphs and sum-product algorithm
- Encoding and decoding of LDPC codes
- Gaussian approximation and Density Evolution
- RA codes
- Polar codes