

ELEC-E7240 Coding Methods D (5 cr) spring 2021

Due to the pandemic, the course is this time arranged in a different way than earlier. Teaching is done via Zoom; links and study material can be found in MyCourses.

Lectures

The lectures take place on Mondays 12–14 and Wednesdays 10–12 and are given by Prof. Patric Östergård (patric.ostergard@aalto.fi).

Date	Topic
11.01	Introduction
13.01	Algebra I
18.01	Algebra II
20.01	Linear Codes I
25.01	Linear Codes II
27.01	Cyclic Codes
01.02	BCH and Reed-Solomon Codes
03.02	Convolutional Codes I
08.02	Convolutional Codes II
10.02	Modern Coding Methods I
15.02	Modern Coding Methods II, Channels with Feedback
17.02	No lecture (spare lecture slot)
24.02	Exam

The course literature is

[Wic] S. B. Wicker, *Error Control Systems for Digital Communication and Storage*, Prentice-Hall, Upper Saddle River, NJ, 1995.

and, for turbo and LDPC codes,

[CF] J. Castiñeira Moreira & P. G. Farrell, *Essentials of Error-Control Coding*, Wiley Chichester, UK, 2006.

Exercises

The exercises take place on Thursdays 14–16. The course assistant is Dr. Daniel Heinlein (daniel.heinlein@aalto.fi). The exercises consist of homeworks and tutorials. The homeworks are graded and the total number of points is obtained from the percentage of correct solutions multiplied by 0.12 (that is, maximum is $100 \times 0.12 = 12$ points). Moreover, there will be programming tasks that can give up to 4 bonus points.

Date	Topic	Homework deadline
14.01	Introduction	21.01
21.01	Abstract algebra	28.01
28.01	Linear Codes	04.02
04.02	Cyclic, BCH, Reed–Solomon Codes	11.02
11.02	Convolutional Codes	18.02
18.02	Turbo codes, LDPC codes	No homework

Grading

The course can be passed in two ways, via **activity points** and via **exam only**. The alternative based on activity points supports learning best. However, for students that for one reason or another are not able to attend the events, the exam-only alternative is an option. Note that the exam is included, and **mandatory**, in the activity-points alternative. Each student essentially gets two grades for these two alternatives; the better counts.

The maximum amount of points in the exam is 24. The grading for the exam only is as follows:

Grade	Points
0	0–9
1	10–12
2	13–15
3	16–18
4	19–21
5	22–24

The maximum amount of activity points is $36 = 24$ (exam) + 12 (homeworks), and the programming tasks can give additional 4 points. **Note!** To pass the course, the amount of exam points must be at least 6. Grading:

Grade	Points
0	0–9.5
1	10–14.5
2	15–19.5
3	20–24.5
4	25–29.5
5	30–36

There are exams on 24.02.21 and 10.05.21. Detailed instructions for the exams will be given later.