



## Course syllabus

Faculty of Technology

Department of Mathematics

4MA424 Kodningsteori, 7,5 högskolepoäng

Coding Theory, 7.5 credits

### Main field of study

Mathematics

### Subject Group

Mathematics

### Level of classification

Second Level

### Progression

A1F

### Date of Ratification

Approved 2014-10-03

Revised 2016-06-15 by Faculty of Technology.

The course syllabus is valid from autumn semester 2016

### Prerequisites

4MA421 Algebraic structures II, 7.5 credits or equivalent.

## Objectives

After completing the course, the student should be able to

- independently and with adequate techniques solve problems, perform calculations, and conduct lines of reasoning within the part of mathematics that is covered by the course, and to clearly communicate these solutions, calculations, and reasonings in writing
- critically, independently, and creatively identify and formulate coding theoretical problems and carry out advanced exercises within given time limits
- clearly present and discuss coding theoretical results orally as well as in writing, in accordance to an established scientific and mathematical practice.

## Content

Hamming distance and Hamming weight, finite fields, linear codes, generating and parity-check matrices, bounds on codes, perfect codes, cyclic codes. Some important examples of codes, especially Hamming codes, Reed-Muller codes, BCH codes, and Reed-Solomon codes.

## Type of Instruction

Lectures and seminars.

## Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

The student's knowledge is assessed in the form of assignments and a project work.

### Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty.

### Credit Overlap

The course cannot be included in a degree along with the following course/courses of which the content fully, or partly, corresponds to the content of this course: 4MA124 Coding Theory, 7.5 credits

### Other

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

### Required Reading and Additional Study Material

Ling & Xing, *Coding Theory. A First Course*, Cambridge University Press, 2004 or later. 170 (222) pages