



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 by Faculty of Technology 2014-10-03
The course syllabus is valid from autumn semester 2015

Prerequisites

4MA421 Algebraic structures II, 7.5 credits or equivalent.

Objectives

After completing the course, the student is expected to

- master the fundamental principles of encoding, error detection and correction, and decoding
- be well aware of the most common bounds on error-correcting codes
- be able to apply the theory when it comes to constructing those error-correcting codes, that are discussed within the course, and decide their error detection and correction capabilities
- show deeper knowledge for some area within the theory of error correcting codes.

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 examination consists of written assignments, of which some are laboratory (4.5 credits) and a project (3 credits).

Course Evaluation

A course evaluation will be carried out and compiled after the course is completed. The compilation will be presented to the current board as well as to the students and filed.

Credit Overlap

This course cannot be part of a degree in combination with another course in which the content fully or partly correspond 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