



FEO3300 Multiuser Information Theory 8.0 credits

Informationsteori för fleranvändarkanaler

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for FEO3300 valid from Spring 2019

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Required prerequisite for this course is the basic course on information theory EQ2840/F2EO3210 "Information Theory"

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After the course the student should be able to

1. discuss and review recent advances on classical results on multi-user information theory,
2. apply the conceptual proof techniques to solve information-theoretic multi-user problems,
3. generalize and apply fundamental coding and outer bound methods to solve information-theoretic multi-user problems,
4. apply and transfer basic skills for solving frequently arising side problems in information theory.

Course contents

Typical Sequences, Multiple access channel, Cut-set bound, Gel'fand Pinsker coding, Wyner-Ziv coding, Broadcast channel, Relay channel, Bounding cardinality, Fourier-Motzkin method, Arimoto-Blahut algorithm, Feedback channel

Disposition

Lecture, homework problems, short essays, peer assessments, presentation or review of a selected paper

Course literature

- Lecture Notes on Network Information Theory by A. El Gamal and Y.-H. Kim (available under arXiv:1001.3404v1).
- Information Theory and Network Coding by R. Yeung.

Complementary literature

- Topics in Multi-User Information Theory by G. Kramer, 2007 (NOW Foundations and Trends in Communications and Information Theory).
- Elements of Information Theory by T. Cover and J. Thomas.
- Coding theorems for discrete memoryless channels by I. Csiszár and J. Körner.

Examination

- EXA1 - Examination, 8.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

To pass the course the student

- has to hand in every homework and do peer assessment for each. For each homework a minimum number of points must be achieved as well as the sum of all achieved points has to exceed a threshold, and
- has to do a review of a pre-print work published on ArXiv or give a 15-30 min oral presentation of a published Trans IT paper.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.