



# FEO3210 Informationsteori

## 12,0 hp

Information Theory

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

### Fastställande

.

### Betygsskala

P, F

### Utbildningsnivå

Forskarnivå

### Särskild behörighet

Mandatory Prerequisites

- Signals and systems corresponding to EQ1100 “Signaler och System”
- Stochastic processes and signal theory corresponding to EQ1220 “Signalteori”

Recommended

- Digital communications corresponding to EQ2310 “Digital Communications”

### Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

# Lärandemål

After the course, the student should be able to:

- describe the general principles of information theory
- explain fundamental concepts such as entropy, mutual information, capacity, compression, coding theorem, coding and codes, basic algebraic coding theory
- formulate and prove the most fundamental coding theorems
- design a linear code that meets given requirements on rate and minimum distance
- explain how information theory and coding contributes to modern communications technology
- solve advanced problems in the area
- do research using tools from information theory

# Kursinnehåll

entropy and mutual information, the asymptotic equipartition principle, entropy for stochastic processes (entropy rate), introduction to data compression and source coding, channel capacity and coding for noisy channels, capacity for different channel models (with emphasis on discrete memoryless channels and Gaussian channels), finite field theory, design and analysis of error correcting codes (with a focus on linear block codes), introduction to network information theory

# Examination

- EXA1 - Examination, 12,0 hp, betygsskala: P, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

# Övriga krav för slutbetyg

The main focus is on homework problems. Each assignment (set of homework problems) will be graded according to (thresholds given are approximate):

-1: less than 5% of assignment solved correctly

0: between 5% and 40% of assignment solved correctly

1: between 40% and 80% of assignment solved correctly

2: more than 80% of assignment solved correctly

There are 11 assignments in total, and the threshold for receiving grade "Pass" is 15 points. An additional requirement to receive grade "Pass" is to review and present a journal paper in the field.

## Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.