# COURSE DETAIL

| INFORMATION THEORY |
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| **Country**<br>Sweden |
| **Host Institution**<br>Lund University |
| **Program(s)**<br>Lund University |
| **UCEAP Course Level**<br>Upper Division |
| **UCEAP Subject Area(s)**<br>Engineering Computer Science |
| **UCEAP Course Number**<br>149 |
| **UCEAP Course Suffix** |
| **UCEAP Official Title**<br>INFORMATION THEORY |
| **UCEAP Transcript Title**<br>INFORMATION THEORY |
| **UCEAP Quarter Units**<br>6.00 |
| **UCEAP Semester Units**<br>4.00 |

**Course Description**
This course provides an up-to-date introduction to topic information theory. The course emphasizes both the formal development of the theory and the engineering implications for the design of communication systems and other information handling systems. The course includes: Shannon's information measure and its relatives, both for the discrete and continuous case; Three fundamental information theorems: typical sequences, source coding theorem and channel coding theorem; Source coding: optimal coding and construction of Huffman codes, as well as universal source coding such as Ziv-Lempel coding (zip, etc.); Channel coding: principles of error detection and correction on a noisy channel, mainly illustrated by Hamming codes; Gaussian channel: continuous sources and additive white noise over both band limited and frequency selective channels; Derivation of the fundamental Shannon limit; Discrete input Gaussian channel: Maximum achievable rates for PAM and QAM, Coding and Shaping gain, and SNR gap; Rate distortion theory: source coding theorem and the fundamental limit revisited when a certain level of distortion is allowed.

**Language(s) of Instruction**
English

**Host Institution Course Number**
EITN45

**Host Institution Course Title**
INFORMATION THEORY

**Host Institution Campus**
Engineering

**Host Institution Faculty**

**Host Institution Degree**

**Host Institution Department**
Engineering- Computer Science

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