

Kursplan för läsåret 2001/2002

INFORMATIONSÖVERFÖRING

EIT100

Information Transmission

Poäng: 5.0 **Betygskala:** TH. **Obligatorisk för:** C1.

Kursansvarig: Professor Rolf Johannesson,
Rolf.Johannesson@it.lth.se. **Rekommenderade förkunskaper:**
Matematik, endimensionell analys.. **Prestationsbedömning:**
Skriftlig tentamen (5 timmar) av problemlösningstyp. **Webbsida:**
<http://www.it.lth.se>

Mål:

The course introduces the ideas of modern communication technology. The course objectives are to answer some basic questions: What kinds of information need to be sent? How are they measured? How can they be transmitted or stored? What is the advantage of digital transmission? How do communication networks function? What natural laws govern information transmission? The course prepares the student to choose among more advanced offerings.

Competence objectives: Each student is expected to be able to decide the difficulty level of the problems encountered, compare this level to her/his own ability, and to identify and improve their abilities if insufficient.

Cognitive objectives: The objectives of the course are to provide the students with professional confidence so that they are able to make an informed choice of future electives within the areas of information transmission and communication engineering.

The student should have an overview of the basic problems and solutions that are encountered in the field, as well as an ability to analyze and describe information transmission systems of low to medium complexities.

Innehåll:

- **Introduction**
How do we broadcast music?
(Mobile telephony, History)
- **Why sinusoids?**
How do we describe a communication system mathematically? (Sines and cosines, Fourier transform, Linear and time-invariant systems, Impulse response, Sinusoid in-sinusoid out, What is bandwidth?)
- **What is out there that need to be sent?**
What came after smoke signals?

(Various information sources, voice, video, data.
Compression, Hoffman coding)

- **How is it sent?**

Sending information from here to there and from now to then.

(Modulation, carrier, Sequences of pulses, BPSK, QPSK, Various types of channels, Noise)

- **What did Shannon promise?**

Correcting errors and approaching Shannon's limit

(Entropy, Mutual information, Channel capacity, $E_b/N_0 > -1.6$ dB, Hamming distance, Block codes, Convolutional codes, Viterbi decoding)

- **Lets get connected**

(Networks, etc)

- **Security**

- **Kopplingar till andra kurser**

Inhämtade matematikkunskaper kommer att tillämpas i kursen. De teknologer som önskar fördjupade kunskaper inom olika delområden hänvisas till institutionens valfria kurser inom informationsteori/telekommunikationsområdena.

Litteratur:

John B. Anderson and Rolf Johannesson, *Understanding Information Transmission*, Class notes.