t.INT - Informationstheorie

Person responsible for the course:	Kurt Hauser, husr
Credits:	4
Valid for:	2011/2012
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Learning objectives:

INT deals with digital data transmission systems and their optimization:

- The students will get knowledge about the 'source coding' and 'error control coding' issues.

- The students will know how to realize the source coding and the error control coding in practice.

- The students will know the modelling and simulation of digital transmission systems by the use of pseudo noise sequences.

- The students will be able to implement a data compression device based on technical specification.

- The students will have the knowledge to implement a channel coding system fit to work in a noisy channel.

Course content:

Theory:

- The information theory (Shannon)

- The definition of entropy in communication theory, calculating entropy.

- Optimized source coding by Huffman and Lempel-Ziv algorithms. Image compression with JPEG.

- Error control coding: Error detection & correction. Hamming distance, channel capacity, Hamming code, CRC-code, BCH-code and RS-code.

- Convolutional codes

Exercises:

- Entropy and binary memoryless source

- Lossless source coding and Huffman coding

- Calculation the information quantity per event and calculating entropy of a given file by applying PHP. Development of a Huffman code generator for the given file.

- Data compression based on the dictionary approach.

- Pseudo noise sequences; error correction by the use of block codes.

Previous knowledge:

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Teaching method:

Type of lesson:	Number of lessons per week:
Lecture	14*2
Tutorial/Practicum	14*2
Group teaching	
Block instruction	
Seminar	

Assessment:

According to the table or as specified in writing by the lecture at the beginning of the semester!

Number	Type	Weighting
1	End of term exam	70%
2	Exam during the semester	15% + 15%
	Further assessments	

Language of instruction:

German

Instruction material:

Script (70%), slides (30%)

Written exercises

Literature: Grundlagen der Kommunikationstechnik. Autor: John G. Proakis. Verlag: Pearson Studium.

Comments:

In "Übungen / Praktika": It will be "Übungen" and "Praktika".

This course description is for information. If the lecturer himself orders further work to be done it will be his order which has to be fulfilled.