t.PhInt - Physics of Information Technology

Person responsible for the course:	Rudolf Marcel Füchslin, furu
Responsible OU:	ZAMP
ECTS:	4
Valid for:	2012/2013
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Expertise:

(Lectures in English or German)

The students get basic knowledge about the physical mechanisms underlying recent IT technology. In the first part of the course, we focus on concepts in applied solid state physics with emphasis on semiconductor devices, magnetic storage and optical devices such as laser. In the second part, we give an overview over structural properties of self organizing networks with strong emphasis on the internet. We discuss simple dynamical models that reveal relations between network structure and the spread of content, with a focus on malware.

The overall goal of this course is to give students the physical background to read introductory material into specialized topics on the master level.

Methodological skills:

PhIT or equivalent intdroduction to physics.

Social skills:

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Personal skills:

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Learning objectives:

Students are familiarized with concepts from modern physics.

Course content:

- Introduction to electron band theory
- Classical, semi classical and quantum theory of conduction
- Semiconductors: Materials and devices
- Magnetic materials
- Interaction of matter with light
- Laser
- Outlook: Quantum computing
- The physics of networks: The physicists look on structural properties of the internet
- Guest lecture(s): Computational physics at the SoE The institute for computational physics ICP

Previous knowledge:

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Teaching method:

Type of lesson:	Number of lessons per week:
Lecture	2
Tutorial/Practicum	2
Block instruction	

Assessment:

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

description	type	form	scope	assessment	weighting
Performance records during school hours					
Semester end exam					

Language of instruction:

English

Instruction material:

Lecture notes (script, slides)

Additional literature:

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Comments:

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