

## t.NTS2 - Natur, Technik und Systeme 2

**Person responsible for the course:** Hans Ulrich Fuchs, fusa

**Credits:** 7

**Valid for:** 2011/2012

**Last saved:** 18.01.2012 14:14

### Learning objectives:

Description, experimental investigation, analysis and modeling of natural and technical dynamical systems. Students develop an understanding of systems science and scientific methods.

Strengthening knowledge of physical and chemical processes. Building up of process thinking and analogical reasoning (transfer of models to new applications and fields). Students learn to apply important computer based tools for data acquisition, data analysis and dynamical modeling.

Development of techniques for project planning and execution of projects, as well as of scientific writing and presentation.

### Course content:

Physics of dynamical thermal and thermo-electro-chemical systems. Formulation and analysis of models of oscillatory systems. Mathematical systems theory.

Handling of time series. Modeling and simulation of dynamical systems.

Semester project; written report and/or oral (poster) presentation.

### Previous knowledge:

Natural and Technical Systems 1

Mathematics of the first semester of WI

### Teaching method:

Type of lesson:	Number of lessons per week:
Lecture	14x2L
Tutorial/Practicum	
Group teaching	14x4L
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	60%
2	Exam during the semester	15%
3	Further assessments	25%

### Language of instruction:

English or German

---

**Instruction material:**

Lecture notes, eLearning-modules with data of experiments and models, slides, old exams.

Fuchs, Borer, Frommenwiler, Knoll, Kopacsy, Maurer, Schütz, Studer: Physik - eine systemdynamischer Zugang für die Sekundarstufe II, hep-verlag, 2010.

Fuchs: Modeling of Uniform Dynamical Systems, 2002.

Fuchs: The Dynamics of Heat. Springer, New York, 2010.

---

**Comments:**

Course details are fixed and communicated at the beginning of the semester.