



Announcement

Physical Electronics

Prof. Dr. Berndt Koslowski, Johannes Lang

Learning Outcomes

After attending the course the students will

- know the most common electronic devices, their building blocks, their properties and their applications.
- be able to construct the most common circuits and simulate them using suitable software.

Content

Lecture

- Fundamentals (block diagram, signal flow diagram, transfer functions, continuous signals, 4-poles and 4-poles theory, modulation theory, background noise)
- Components (semiconductor basics and components, phenomena of electrical contacts, fundamental circuits, alternatives to classical semiconductors)
- Circuit technology (circuit with transistors and amplifier, filters)

Laboratory course

Simulation and design of

- Fundamentals of Electrical Engineering
- Transistor circuits, analogue circuits, logical circuits
- Fundamental and advanced circuits with operational amplifiers
- Design, experimental setup, and analysis of electronic circuits
- Optional: sensors, detectors, basic devices, micro-controllers, FPGAs

Recommended Prerequisites

- Electrodynamics, Thermodynamics, Atomic Physics, Solid State Physics

Literature

There is an overwhelming crop of literature in this field; most comprehensive are

- U. Tietze, Ch. Schenk, (Eberhard Gamm,) Halbleiter-Schaltungstechnik, currently 16. Auflage, 2019, Springer Verlag Berlin chapters 1-3, 5 & 6;
- Paul Horowitz, Winfield Hill, Thomas C. Hayes, Michael Herzogenrath, 7. Auflage 1996 und höher,
- Die hohe Schule der Elektronik I, Analogtechnik, Elektor Verlag, chapters 1-9.

Details

Lecture (3 hours per week) and laboratory (5 experiments, each 12 hours)

6 ECTS credits

Module 71507, 12107, 12117 Physical Electronics

maximum 12 participants

Assessment

Oral examination (6 CP)

Lecturer

Prof. Dr. Berndt Koslowski, Institute of Solid State Physics