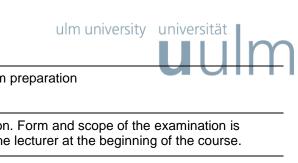




Module	Physical Electronics
Code	71507
Instruction language	English
ECTS credits	6
Credit hours	7
Duration	1 semester
Cycle	Summer semester
Coordinator	apl. Prof. Berndt Koslowski
Lecturer	apl. Prof. Berndt Koslowski
Allocation to study programmes	Physics M.Sc., elective module, 1 st or 2 nd semester Wirtschaftsphysik M.Sc., elective module, 1 st – 3 rd semester
Formal prerequisites	
Recommended prerequisites	Electrodynamics, Thermodynamics, Atomic Physics, Solid State Physics
Learning objectives	 Students who successfully passed this module know the electronic components, their construction, properties and application are able to construct, simulate and understand the most important analogue and digital circuits
Syllabus	 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 (5 experiments, 4 hours per week) Simulation and construction of: Transistor circuits, analog 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
Literature	U. Tietze Schenk, Ch. Schenk, (Eberhard Gamm,) Halbleiter- Schaltungstechnik, aktuell 16. Auflage, 2019, Springer Verlag Berlin, chapters 1-3, 5 & 6; Paul Horowitz, Winfield Hill, Thomas C. Hayes, Michael Herzogenrath, 7. Auflage 1996, Die hohe Schule der Elektronik I, Analogtechnik, Elektor Verlag, chapters 1-9; e.v.a.m.
Teaching and learning methods	Lecture (3 hours per week) Laboratory course (4 hours per week)
Workload	45 hours lecture (attendance time) 60 hours laboratory course (attendance time)





OOOGENDO	75 hours self-study and exam preparation Total: 180 hours
Assessment	Oral (opt. written) examination. Form and scope of the examination is determined and notified by the lecturer at the beginning of the course.
Examination	Written or oral
Grading procedure	The module grade is the examination grade.
Basis for	Research in the field of experimental research.