



Module	<i>Physical Electronics</i>
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 <ul style="list-style-type: none">• know the electronic components, their construction, properties and application• are able to construct, simulate and understand the most important analogue and digital circuits
Syllabus	<p>Lecture</p> <ul style="list-style-type: none">• 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) <p>Laboratory course (5 experiments, 4 hours per week)</p> <p>Simulation and construction of:</p> <ul style="list-style-type: none">• 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)



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.
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Examination	Written or oral
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Grading procedure	The module grade is the examination grade.
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Basis for	Research in the field of experimental research.
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