Data:	SEMIC. MA. Nr. 3213 / Examination number: 22306	Version: 20.07.2016	Start Year: WiSe 2016
Module Name:	**Semiconductors**		
(English):			
Responsible:	Gumeniuk, Roman / Prof.		
Lecturer(s):	Gumeniuk, Roman / Prof.		
Institute(s):	Institute of Experimental Physics		
Duration:	1 Semester(s)		
Competencies:	The module conveys basic knowledge on the principles of semiconductor materials and devices based on their crystallographic and electronic structures. Students will get familiar with the electronic properties of semiconductors and should be able to calculate charge carrier concentrations and to describe and understand semiconductor devices based on energy band schemes.		
Contents:	The lecture is divided in four consecutive parts: • Structure of solids: crystal structure in general, examples of element structures and compound structures. • Electrons in matter: energy bands, zone schemes, Brillouin zones, band structures, Fermi distribution, density of states, population density, effective mass, conductivity. • Semiconductors: intrinsic vs. extrinsic semiconductors, band schemes, conductivity, possible defects. • Semiconductor devices: metal-semiconductor contact, p-n junction, diodes, transistors, memory devices, device fabrication.		
Literature:	Standard references on solid state physics and semiconductors for physicists, e.g.: • R. E. Hummel: Electronic Properties of Materials (Springer) • N. W. Ashcroft, N. D. Mermin: Solid State Physics (Brooks Cole) • S. M. Sze: Physics of Semiconductor Devices (Wiley)		
Types of Teaching:	S1 (WS): Semiconductors / Lectures (2 SWS)		
Pre-requisites:	**Recommendations:** Fundamentals of physics, chemistry and solid materials		
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA [120 min]		
Credit Points:	3		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA [w: 1]		
Workload:	The workload is 90h. It is the result of 30h attendance and 60h self-studies.		