

PHY-M-VF 7 / NS-M-1

Effective WS 2011/12

1. Module title:	Physics of Nanostructures
2. Field / responsibility of:	Physics / the faculty, the Dean of Studies
3. Module contents:	<ul style="list-style-type: none"> • Introduction: Definitions, sizes, overview • Fabrication of nanostructures: Types of material, structuring, self-organization • Highly mobile, two-dimensional charge carrier systems • Electrical transport in the magnetic field: Quantum Hall effects, topological insulators • Electrical characteristics of one-dimensional systems: ballistic transport • Transport through quantum dots: Coulomb and spin blockade • Optical characteristics of two- and one-dimensional nanostructures • Optical spectroscopy of individual quantum dots • Optical spin injection and detection in nanostructures • Nanophotonics • Plasmonics • Molecular electronics
4. Qualification objectives of the module / competencies to be acquired:	Acquiring knowledge of fundamental physical characteristics of nanostructures and the quantum phenomena that occur in these structures. This module covers both the underlying physical concepts and experimental methods. In addition, the fabrication of nanostructures and their fields of application in basic research and technology will be discussed.
5. Prerequisites for participation:	
a) Recommended knowledge:	Atomic physics, solid-state physics, quantum mechanics I
b) Prerequisite courses:	None
6. Module can be used for:	MSc. in Physics, MSc. in Nanoscience, MSc. in Comp. Science
7. Module is offered:	On a yearly basis
8. Module can be completed in:	1 semester
9. Recommended semester of study:	Minimum: 1
10. Overall module workload / number of credit points:	<p>Workload: Total number of hours: 240 Allocation: 1. Attendance: 4 credit hours 2. Independent study (including exam preparation/ exam): 180 hours Credit points: 8</p>

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11. The module is successfully completed when the requirements below have been met.					
12. Module components:					
Nr.	Req./req. elective	Form of teaching	Subject area / topic	Credit hours	Coursework
PHY-M-VF 7 .1	Required elective	Lecture	Physics of nanostructures	4	
13. Module exam:					
Nr.	Competence / topic	Type of exam	Duration	Time / notes	Weighting for module grade
PHY-M-VF 7 .1	Physics of nanostructures			Type of exam: Oral or written; duration: 20 min, or 105 min, 135 min or 210 min (if it consists of two parts); time: Lecture period to end of semester	1
14. Notes:					
Further information will be provided by the instructors at the beginning of the course.					