Module title			Abbreviation
Theoretical Physics 1 and 2 Nanostructure Technology (Mechanics, Quantum Mechanics, Electrodynamics, Thermodynamics, Statistical Physics)			11-TPN-092-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Theoretical Physics and Astrophysics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
16	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	undergraduate	--	

Contents

Physical laws and elementary methods of Theoretical Physics. Mechanics: Newton's laws, physical values and conservation laws, systems of mass points, reference systems, one-dimensional motion, Lagrange equations, applications, Hamiltonian dynamics. Quantum mechanics: Schrödinger equation, one-dimensional quantum mechanics, abstract quantum mechanics (operator formalism), angular momentum, spin. Electrodynamics: Maxwell equations, electrostatics, magnetostatics, dynamics of electromagnetic fields, special relativity. Thermodynamics: Heat, entropy, thermal equilibrium, measurands, level of efficiency, thermodynamic potentials, phase transitions.

Intended learning outcomes

The students know the basic principles, contexts and elementary methods of Theoretical Physics, theoretical mechanics, quantum mechanics, thermodynamics, electrodynamics and Statistical Physics.

Courses (type, number of weekly contact hours, language — if other than German)

Theoretische Physik 1 (Lehramt, Nanostrukturtechnik) (Theoretical Physics 1 (Teaching Degree, Nanostructure Technology)): V (4 weekly contact hours) + Ü (2 weekly contact hours), once a year (summer semester)
Theoretische Physik 2 (Lehramt, Nanostrukturtechnik) (Theoretical Physics 2 (Teaching Degree, Nanostructure Technology)): V (4 weekly contact hours) + Ü (2 weekly contact hours), once a year (winter semester)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

This module has the following assessment components
1. Topics covered in lectures and exercises in part 1 (Theoretische Physik 1 (Theoretical Physics 1)): written examination (approx. 120 minutes, usually chosen) or oral examination of one candidate each (approx. 30 minutes).
2. Topics covered in lectures and exercises in part 2 (Theoretische Physik 2 (Theoretical Physics 2)): written examination (approx. 120 minutes, usually chosen) or oral examination of one candidate each (approx. 30 minutes).
3. Topics covered in lectures and exercises in parts 1 and 2: oral examination of one candidate each (approx. 30 minutes, usually chosen) or written examination (approx. 120 minutes).

Successful completion of approx. 50% of practice work each is a prerequisite for admission to assessment components 1 and 2.
To qualify for admission to assessment component 3, students must pass assessment component 1 and/or 2. Students are highly recommended to attend both courses Theoretische Physik 1 (Theoretical Physics 1) and Theoretische Physik 2 (Theoretical Physics 2). The topics discussed in these two courses will be covered in assessment component 3.
Students must register for assessment components 1 through 3 online (details to be announced).
To pass this module, students must first pass assessment component 1 or 2 and must then pass assessment component 3.
The grade achieved in assessment component 1 or 2 (whichever is better) and the grade achieved in assessment component 3 will each count 50% towards the overall grade awarded for the module.

Allocation of places

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Additional information
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Workload
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Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
§ 77 (1) 1. c) Physik "Theoretische Physik"
Module appears in
Bachelor's degree (1 major) Nanostructure Technology (2010)