Module title			Abbreviation
Theory of Relativity			11-RTTB-232-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)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Mathematical Foundations
Differential forms
Brief Summary of the special relativity
Elements of differential geometry
Electrodynamics as an example of a relativistic gauge theory
Field equations of the fundamental structure of general relativity
Stellar equilibrium and other astrophysical applications
Introduction to cosmology

Intended learning outcomes

Familiarity with the basic physical and mathematical concepts of general relativity. Mathematical understanding of the formulation in terms of differential forms. Understanding of the formal similarity between electrodynamics and the theory of general relativity, viewing both of them as gauge theories. Application of the theory to simple models of stellar equilibrium. First contact with elements of cosmology.

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

V (3) + R (1)
Module taught in: German or English

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

a) written examination (approx. 90 to 120 minutes) or b) oral examination of one candidate each (approx. 30 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes per candidate) or d) project report (approx. 8 to 10 pages) or e) presentation/talk (approx. 30 minutes).
If a written examination was chosen as method of assessment, this may be changed and assessment may instead take the form of an oral examination of one candidate each or an oral examination in groups. If the method of assessment is changed, the lecturer must inform students about this by four weeks prior to the original examination date at the latest.
Language of assessment: German and/or English
Assessment offered: In the semester in which the course is offered and in the following semester

Allocation of places

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Additional information

Approval from examination committee required

Workload

180 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in
Bachelor' degree (1 major) Physics (2015)
Bachelor' degree (1 major) Mathematical Physics (2015)
Bachelor' degree (1 major) Mathematical Physics (2016)
Bachelor' degree (1 major) Physics (2020)
Bachelor' degree (1 major) Mathematical Physics (2020)
Bachelor' degree (1 major) Mathematical Physics (2024)