

<b>Module title</b>		<b>Abbreviation</b>
Theory of Relativity		11-RTT-161-mo1
<b>Module coordinator</b>		<b>Module offered by</b>
Managing Director of the Institute of Theoretical Physics and Astrophysics		Faculty of Physics and Astronomy
<b>ECTS</b>	<b>Method of grading</b>	<b>Only after succ. compl. of module(s)</b>
6	numerical grade	--
<b>Duration</b>	<b>Module level</b>	<b>Other prerequisites</b>
1 semester	graduate	--
<b>Contents</b>		
<ol style="list-style-type: none"> <li>1. Mathematical Foundations</li> <li>2. Differential forms</li> <li>3. Brief Summary of the special relativity</li> <li>4. Elements of differential geometry</li> <li>5. Electrodynamics as an example of a relativistic gauge theory</li> <li>6. Field equations of the fundamental structure of general relativity</li> <li>7. Stellar equilibrium and other astrophysical applications</li> <li>8. Introduction to cosmology</li> </ol>		
<b>Intended learning outcomes</b>		
<p>The students become familiar with the principal physical and mathematical concepts of general relativity. The main topics include modern formulation on the basis of differential forms. Furthermore, the similarities between electrodynamics as a gauge theory and general relativity are emphasised. The students learn to apply the theory to simple models of stellar equilibrium and are introduced to basic elements of cosmology.</p>		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
V (3) + R (1) Module taught in: German or English		
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)		
<p>written examination (approx. 90 to 120 minutes) or oral examination of one candidate each (approx. 30 minutes) or oral examination in groups (groups of 2, approx. 30 minutes per candidate) or project report (approx. 8 to 10 pages) or presentation/talk (approx. 30 minutes).</p> <p>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.</p> <p>Assessment offered: In the semester in which the course is offered and in the subsequent semester Language of assessment: German and/or English</p>		
<b>Allocation of places</b>		
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<b>Additional information</b>		
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<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)		
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<b>Module appears in</b>		
<p>Master's degree (1 major) Mathematics (2016)  Master's degree (1 major) Physics (2016)  Master's degree (1 major) Mathematical Physics (2016)  Master's degree (1 major) Computational Mathematics (2016)</p>		

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)  
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)  
Master's degree (1 major) Computational Mathematics (2019)  
Master's degree (1 major) Mathematics (2019)  
Master's degree (1 major) Physics (2020)  
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)  
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)  
Master's degree (1 major) Mathematical Physics (2020)