Module	***Allgemeine Relativitätstheorie***
Code	76005
Instruction language	Deutsch
ECTS credits	6
Credit hours	5
Duration	1 semester
Cycle	irregular
Coordinator	Dean of Physics Studies
Lecturer	Dr. Ralf Aurich
Allocation to study programmes	Physics M.Sc., elective module, 1st or 2nd semester
Formal prerequisites	
Recommended prerequisites	Basic knowledge of nuclear physics, particle physics and astrophysics
Learning objectives	Students who successfully passed this module can deal with the tensor equations occuring in general relativity and have an understanding of gravitational waves and of black holes.
Syllabus	• Tensor calculus • Einstein field equations • Weak fields and pertubation theory • Gravitational waves • From the Schwarzschild metric to the Kruskal metric • Carter-Penrose diagrams
Literature	• C.Misner, K.Thorne & J.Wheeler: *Gravitation* (1973) • S.Weinberg: *Gravitation And Cosmology: Principles And Applications Of The General Theory Of Relativity* (1972) • T.Padmanabhan: *Gravitation* (2010) • R. d'Inverno: *Einführung in die Relativitätstheorie* (2009) • N.Straumann: *General Relativity: With Applications to Astrophysics* (2004) • R.Sexl & H. Urbantke: Gravitation und Kosmologie (2002) • H.Goenner: *Einführung in die spezielle und allgemeine Relativitätstheorie* (1996) • L.D.Landau & E.M.Lifschitz: *Lehrbuch der Theoretischen Physik II: Klassische Feldtheorie* (1994)
Teaching and learning methods	Lecture (3 h/week) with exercise (2 h/week)
Workload	45 h Lecture 30 h Exercise 105 h Self-study and exam preparation Total: 180 h
Assessment	Written or oral examination. Form and scope of the examination is determined and notified by the lecturer at the beginning of the course.
Examination	16005 Allgemeine Relativitätstheorie

	16505 Allgemeine Relativitätstheorie (Vorleistung)
Grading procedure	The module grade is the examination grade.
Basis for	Research in the field of gravitational physics and cosmology.