

Modules:

physics700 **Elective Advanced Lectures**
 physics730 **Theoretical Physics**

Course:

General Relativity and Cosmology (T)

Course No.: physics754

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	3+2	7	ST

Requirements:**Preparation:**

physik221 and physik321 (Theoretical Physics I and II)
 Differential geometry

Form of Testing and Examination:

Requirements for the examination (written): successful work with the exercises

Length of Course:

1 semester

Aims of the Course:

Understanding the general theory of relativity and its cosmological implications

Contents of the Course:

Relativity principle
 Gravitation in relativistic mechanics
 Curvilinear coordinates
 Curvature and energy-momentum tensor
 Einstein-Hilbert action and the equations of the gravitational field
 Black holes
 Gravitational waves
 Time evolution of the universe
 Friedmann-Robertson-Walker solutions

Recommended Literature:

S. Weinberg; Gravitation and Cosmology (J. Wiley & Sons 1972)
 R. Sexl; Gravitation und Kosmologie, Eine Einführung in die Allgemeine Relativitätstheorie (Spektrum Akadem. Verlag 5. Aufl 2002)
 L.D. Landau, E.M. Lifschitz; Course of Theoretical Physics Vol.2: Classical field theory (Butterworth-Heinemann 1995), also available in German from publisher Harry Deutsch