



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### General Relativity

2122-1-F1701Q084

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#### Aims

General relativity and applications.

#### Contents

- 1) Principles and equations of general relativity.
- 2) Elements of differential geometry.
- 3) Black hole physics.
- 4) Elements of cosmology.

#### Detailed program

- 1) Summary of special relativity. Minkowski spacetime.
- 2) Equivalence principle. Accelerated observers.
- 3) Elements of differential geometry. Curvature. Geodesics.
- 4) Physics on curved spaces. Curvature and gravity. Einstein's equations. Rudiments of Hamiltonian treatment.

Vielbein formalism.

5) Gravitational waves. Black holes: Schwarzschild, charged, rotating solutions. Definition of mass in general relativity. Causality.

6) Elements of cosmology. De Sitter and anti-de Sitter spaces.

## **Prerequisites**

Undergraduate degree in physics.

## **Teaching form**

Lessons, 6 credits.

## **Textbook and teaching resource**

Lecture notes available at <https://www.dropbox.com/s/t84lftb2llgb87w/GR.pdf?dl=0P>

## **Semester**

First semester

## **Assessment method**

Written and oral exam. Exercises and problems on the course's topics.

## **Office hours**

By appointment

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