

- b. Equivalence principle: effect on photons and clocks, gravitational redshift, curved space-time
- c. Description of curved space-time: tensors, bases, surfaces and volumes
- d. Equation of motion: covariant derivative, equation of motion
- e. Variational principle: geodesics, constant of motion
- f. Einstein equation: tidal forces and curvature, energy-momentum tensor
- g. Around stars: Schwarzschild geometry, gravitational redshift, orbits and effective potential (massive particles and photons), Perihelia, light deflection
- h. Black holes: Geometrical issues at the black hole horizon, beyond the horizon, alternative coordinates (Kruskal-Szekeres), astrophysical black holes, Hawking radiation
- i. Cosmology: Geometry of the Universe, cosmological models, measuring cosmological parameters, dark matter and dark energy.

Course Organization

27h courses + 6h TD + 3h written exam

Teaching Material and Textbooks

Material given for each course on claroline.

Evaluation

Mandatory final exam: 3h written exam