Basic/Essential Course Information	
Course title	SPECIAL RELATIVITY
Degree Course title	Physics (Triennale)
ECTS	3
Compulsory attendance	NO
Course teaching language	ITALIAN

Teacher	Maurizio Gasperini	gasperini@ba.infn.it

ECTS Details	Disciplinary area	SSD	ECTS
	Characterizing	FIS/02	3

Time management and teaching activity type	Period	Year	Lesson type
	II° semester	2°	Lectures (16h) Exercizes (15h)

Time management	Total hours	In-class study	Out-of-class study hours
	75	31	44

Course calendar	Starting date	Ending date
	4.03.2019	7.06.2019

Syllabus	
Prerequisites	Newtonian dynamics, notions of analytic mechanis, electromagnetic theory, vector calculus.
Expected learning outcomes (according to Dublin Descriptors)	• *Knowledge and understanding* Knowledge of special relativistic kinematics and dynamics. • *Applying knowledge and understanding* Ability to solve simple exercises and to perform covariant calculations in the context of the Minkowski space-time. • *Making judgements* Ability to compare relativistic hypothesis with experimental tests. • *Transferable Communication skills* Comunication skills in Italian, ability to present and to discuss a relativistic effect in a complete way and with an appropriate scientific language. • *Lifelong learning skills* Ability to approach the specialistic literature and to independently choose the method of solving a relativistic problem.

Course contents summary	Introduction to special relativity and to its main applications to classical physics.
Detailed syllabus	Lorentz transformations, Lorentz group. Tensor calculus in the Minkowski space-time. Relativistic kinematics: time dilatation, length contraction, velocity composition, hyperbolic motion, Rindler space-time. Covariant form of the Maxwell equations. Lorentz transformations of the electric and magnetic field. Relativistic dynamics: covariant Lagrangian formalism and equations of motion. Example: charged relativistic particles interacting with an external electric and magnetic field. Relativistic kinematics of simple scattering and decay processes: center of mass, invariant mass, scattering angles.
Reference book	M. Gasperini, *Manuale di Relatività Ristretta per la Laurea Triennale in Fisica* (Sprinter-Verlag, Milano, 2010).
Notes	All chapters except Appendix B.
Teaching methods	Class lectures/exercises using blackboard.
Assessment methods	Oral colloquium including exercises and calculation tests to be performed on the blackboard.
Evaluation criteria	**- knowledge and understanding** of the basic aspects of the theory of special relativity and its applications to mechanics and electromagnetism; **- ability to solve** simple relativistic exercises; **- ability to present and to discuss** the main relativistic effects; **- ability to** apply the relativistic laws to different sectors of physics.
Other	