YEAR 2010-11
FISICA GENERALE I (12 CFU)
(GENERAL PHYSICS I)
For Electronics and Telecommunications

Lecturer: Giovanni BATIGNANI

Hours of lectures (L):	54
Hours of technical practice (E):	66

Aims:
Comprehension of the fundaments of classical mechanics and classical electromagnetism (in the vacuum).

Contents:
CLASSICAL MECHANICS: Scalars and vectors. Vector representation and analysis. Polar coordinates. The position of as point as a function of time. Velocity and speed. The acceleration of a point. Constant-velocity and constant-acceleration motions on a straight line and in three dimensions. Oscillations and armonic motion. Exponentially dumped oscillations. Circular motions and angular velocity. Description of motion in polar coordinates. Frames and Galilean transformations of velocities and accelerations. Newtons' principia. Gravitational forces between two masses and at the Earth's surface. Coulomb's law. Elastic forces. Normal reaction forces between two surfaces. Static and sliding friction. Friction on a solid body moving in a fluid (without turbolence). The center of mass and the first cardinal equation. The momentum and its conservation. Work and power. The kinetic energy. Conservative laws and potential energy. Mechanical energy and its conservation.. Force momentum and angular momentum. The rigid body and the second cardinal equation. (L: 30; E:36)
CLASSICAL ELECTROMAGNETISM IN VACUUM: STATIC ELECTRIC FIELD. Electric charge densities and electrostatic field. Gauss' law and its applications. Electrostatic field circulation and electric potential. Perfect conductive materials, capacitors and capacitance. Electric currents and electric current density. Ohm's laws. Lorentz's force and static magnetic field. Laplace's force. Biot Savart, Laplace and Ampere's laws. The flux of a magnetic field. Magnetic dipoles. . Elements of quantum physics, Bohr's atom..
(L: 24; E:30)

Reference books, notes and other material:
SERWAY "Principi di Fisica" (seconda edizione, 1999) Edi SES, or

SERWAY-BEICHNER "Fisica per Scienze ed Ingegneria" (terza edizione, 2003) EdiSES

Further information:
Available at the URL: http://www.ing.unipi.it/~a008137
Examinations. Form of assessment:
A written classwork (minimum mark: 18/30) followed by an oral examination