



RADIOACTIVITY II	
Enrollment year	2017/2018
Academic year	2018/2019
Regulations	DM270
Academic discipline	FIS/04 (NUCLEAR AND SUBNUCLEAR PHYSICS)
Department	DEPARTMENT OF PHYSICS
Course	
Curriculum	Fisica nucleare e subnucleare
Year of study	2°
Period	2nd semester (04/03/2019 - 14/06/2019)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	FONTANA ANDREA (titolare) - 3 ECTS MENEGOLLI ALESSANDRO - 3 ECTS
Prerequisites	Notions of nuclear and subnuclear physics, radioactivity, electromagnetism and quantum mechanics.
Learning outcomes	To learn the concepts and phenomena related to the physics of weak interactions and of neutrino.
Course contents	The course is based on the study of the weak interaction phenomenology (parity violation, neutrino and electron helicity, angular distributions) and of the theoretical formalism used for its description (Dirac theory and V-A theory). The topics covered are devoted to three research fields connected with the betadecay and with the physics of neutrino: - nucleosynthesis on stars, in particular on the sun: solar neutrino problem, stellar evolution, r,s and p processes, supernovae, neutron stars, black holes, age of the Universe, dark matter;

	- double beta decay: massive neutrinos, Dirac and Majorana neutrinos, double beta decay with and without neutrino emission, survey of experiments and discussion of experimental results; - neutrino oscillations: theoretical formalism and ideal experiments, neutrinos from accelerators, reactors, atmospheric and solar, survey of experiments and discussion of experimental results.
Teaching methods	Lectures.
Reccomended or required readings	- G. Bendiscioli, Fenomeni Radioattivi: dai nuclei alle stelle, Springer 2013 (II Edizione) - J.S. Lilley, Nuclear Physics, John Wiley and Sons, 2001 - Marco Sozzi, Discrete Symmetries and CP Violation: From Experiment to Theory Oxford Graduate Texts, 2008 - A.C. Phillips, The Physics of Stars, John Wiley and Sons, 1999
Assessment methods	Oral interview with possibility of a seminar on topics chosen from selected literature.
Further information	Oral interview with possibility of a seminar on topics chosen from selected literature.
Sustainable development goals - Agenda 2030	<u>\$ibl_legenda_sviluppo_sostenibile</u>